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STORAGE

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1. DIPTERA FROM THE KHASIA HILLS
2. TABANIDÆ IN THE COLLECTION OF THE FOREST ZOOLOGIST
3. NEW SPECIES OF DIPTERA FROM THE INDIAN REGION

BY

RONALD SENIOR-WHITE, F.E.S

Malariologist, The Kepitigalla Rubber Estates, Limited

[*Lately Acting Dipterist on the Staff of the Imperial Entomologist*]

AGRICULTURAL RESEARCH INSTITUTE, PUSA

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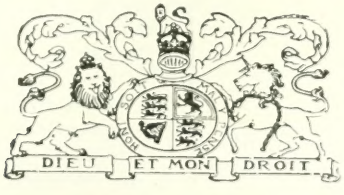

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PREFACE

THE tour on the results of which the following notes are offered, was undertaken during the first three weeks of October 1920, in company with the Imperial Entomologist. The primary object I had in mind was an examination of the dipterous fauna of the Khasia Hills, in greater detail than the existing records afforded, with a view to checking an impression, gained in the study of Indian insect distribution, that the fauna of these hills has a close affinity with that of the Island of Ceylon. To this end no particular attention was paid to any special group which would tend to limit the time available for making captures in the entire order, of which every specimen was taken as it came to hand. That the Imperial Entomologist and Mrs. Bainbrigge Fletcher, who most ably plied a third net in the party, should make over to me for study their dipterous captures, was a kindness which puts me under yet another obligation to them, for, without their help, the facilities obtained could not have been enjoyed. His long experience of the locality enabled the Imperial Entomologist to point out to me the best collecting grounds, which is no slight advantage when the time available is limited.

The first to draw attention to the similarity of insect distribution between these two far distant portions of the Indian Sub-Region was the Imperial Entomologist, who, in a paper in *Spolia Zeylanica* referred to it in connection with the distribution of the Pterophoridæ and Orneodidæ in the Lepidoptera. This, of course, is one of the best known of all the Orders of insects, whilst the Diptera are probably the least known, and it is hoped that the many species now recorded from the Khasia for the first time may, when incorporated in the forthcoming Catalogue of Indian insects, render the distribution of the species in this at least as accurate for these regions as in other Orders, so that, when the volumes have appeared, it may be possible with the aid of the distributions thus indicated to more accurately re-define the faunal Provinces and Zones of the Indian Sub-Region. Though there have been considerable, though still pitifully small, accessions to our knowledge both of species and their distribution since the last attempt at this was made by Lefroy in 1909, it is not the present generation which can hope to see such laid down with any

approach to finality. Still, in the light of the importance of knowing approximately the area which is liable to be affected by an insect which has declared itself a pest in any locality, everything which will tend to improve our knowledge of the boundaries of these zones is of value. Past records have not been searched for references to occurrence ; a full list of species known from the area can be made from the Indian Insect Catalogue when this appears. These notes are merely preliminary to that catalogue.

Of previous investigators of the flies of Assam the following are worthy of special mention :—Col. Hall, who collected largely in Sylhet ; the Rev. Mr. Pettigrew, who worked in Manipur ; Chennell, who made collections of Tabanidæ (but apparently of no other family), on the lower slopes of the northern face of the Khasia itself ; and Dr. and Mrs. Kemp, who in a three months' tour of the Garo Hills brought back a collection to which Brunetti, who partially worked it out, has paid tribute. In a search for the possible occurrence of *Glossina* in India, which was undertaken at the instance of the Medical Authorities, following on Sir David Bruce's incrimination of that genus in the transmission of sleeping sickness, assistants from Pusa did some collecting around Nongpoh. The present Imperial Entomologist has made collections, in common with all Orders, on his various visits to the Hills, which have been partially worked out by Brunetti, whose report on the small collection brought back by Dr. Kemp from Aborland during the expedition of 1912 has served me as a model for the present effort.

The Khasia Hills are situated between East longitudes 91° and 92°, and North latitudes 25° and 26° ; whilst for comparison's sake it might be mentioned that Ceylon lies between longitudes 80° and 82°, and latitudes 6° and 10°. With the Naga, Jaintia and Garo Hills the Khasia form a spur thrown off from the north and south range,—comprising the Patkoi Mountains, Chin Hills and Arrakkan Yoma,—which bound the Himalaya on the east, but they are of a different geological formation. Mainly inhabited by tribes in a complete state of savagery, it is only on the Khasia portion that general travel can be undertaken.

Much of the ground traversed during the tour is famous in the history of Indian biology, having been explored botanically by Sir Joseph Hooker as far back as 1850. The seven months spent by this great Scientist among these hills are recounted in his classic *Himalayan Journals*, and most of the spots mentioned in these notes will be found referred to therein. The northern slopes were not visited ; to traverse the seventy miles from Gauhati, the present route of approach, being, as Hooker explains, then almost certain

death. This tract is still as fever-haunted as it was then, but it is no longer necessary to spend a night in crossing it.

The extreme prolificness of the locality, botanically, was emphasized by Hooker, whilst the Imperial Entomologist has drawn attention to the same condition in regard to the insect fauna. In regard to Diptera, it is certainly the most wonderful area that I have had the good fortune to explore. Nothing in Ceylon can approach it. For the benefit of any other worker who may be in a position to continue the investigation of the Flies of these Hills I would indicate the following places as likely to prove especially productive of results :— The Government Fruit Farm at Shillong, with the Pine Forest above it ; a path through the native village leading from the turn off to St. Joseph's College School to the junction of the two roads below the Lady Minto Nursing Home ; the glade behind the R. C. Cemetery ; and, for localities further afield, the hedges around Mawphlang Dâk Bungalow, and, above all, a small wood about a mile from the Circuit House at Cherrapunji, where most of the mosquitoes were captured. For lower elevations, the scrub around Nongpoh Dâk Bungalow, and the jungle behind the Slaughter House at Gauhati. At the former, in the brief half hour's halt that traffic regulations on the road permit of, I obtained species at the rate of one per minute,—which, though I have never had to work against time in similar fashion elsewhere, I do not think I have ever approached before. If adequate protection could be obtained against malaria, I would place this spot as the finest collecting ground I have ever encountered.

The tour yielded two hundred and eighty-one species, of which nineteen, and a variety, are described as new in another portion of this memoir. How many of my captures in the dozen families in which identification is not yet possible will ultimately prove new, it is impossible even to hazard a guess. Judging by my experience of the numerical extent of the Ceylon dipterous fauna in the only locality where I have fully investigated it over some years, the percentage of the probable number of species existing on the Shillong plateau obtained does not exceed twenty.

In the ensuing notes, species recorded from Ceylon, or obtained there by myself, are marked with an asterisk(*).

RONALD SENIOR-WHITE.

OFFICE OF THE MALARIOLOGIST,
Suduganga, Matale, Ceylon,
15th September 1921.

Elevations of places referred to :—

Gauhati, *ca.* 180′ : Burnihat, *ca.* 600′ : Nongpoh, *ca.* 1,800′ : Shillong, 4,908′ : Mawphlang, *ca.* 6,000′ : Laitlyngkot, *ca.* 5,500′ : Dumpep, *ca.* 5,000′ : Cherrapunji, 4,455′ (heights in feet). Though nearly as high in elevation as Shillong, the temperature at Cherrapunji, with a Southern exposure, is considerably higher than at Shillong, facing North to the Himalaya.

NOTES ON INDIAN DIPTERA.

BY

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[Received for publication on 6th December 1921.]

I. NOTES ON THE DIPTERA OF THE KHASIA HILLS.

CECIDOMYIDÆ.

Asphondylia osbeckiæ. (sp. nov.) A single female, taken early in the morning on flowers of *Osbeckia*, was the only member of this family obtained during the tour. The extraordinary angulated ovipositor (Plate XV, fig. 1) shows special adaptations of an unknown nature. Hitherto only one species has been known from the Khasia, in fact our very fragmentary acquaintance with the family in India is almost entirely confined to Ceylon and the South Indian part of the Ceylonese province. The family must be as abundantly represented in the Assam Hills as anywhere in the East, but it needs special methods of collecting, and hence, in a tour of this nature, numerous captures in it were not to be expected. No deformations on *Osbeckia* were noticed, but no special search was made.

MYCETOPHILIDÆ.

Until now only three species of this family have been recorded from the Hills. A considerable number are known from Sylhet, but what knowledge we have of the family in India is otherwise almost entirely confined to the Himalaya and Ceylon, and many instances of double distribution recorded cannot safely be accepted until the Hills of the Peninsula have been worked.

Sciara brunniventris. (sp. nov.) The unique type was taken at Cherrapunji.

Sciara sp. (near *diversipes*, Brun.). A female from Shillong, in jungle, is either this Eastern Himalayan species or so near it that I cannot separate it with certainty. It differs by the less thickened antennæ and the pale mid femora.

Sciara flavicollis. (Brun.) Taken at Cherrapunji and Dumpep.

Sciara fletcheræ. (sp. nov.) The unique type of this beautiful and distinct species was kicked up among long grass on the river bank at Laitlyngkot, and was taken resting on the author's back by the Imperial Entomologist.

Sciara hirtilineata. (Brun.) A single male, in jungle, Shillong, is this species, previously recorded from the Himalaya, west and east.

Sciara hirtilineatoides. (sp. nov.) Two specimens, Shillong.

Sciara khasiensis. (sp. nov.) The unique type was another of the notable results of a dull, cold day in unpromising-looking country at Laitlyngkot.

**Sciara nigripennis.* (Brun.) Three specimens from Shillong and one from Cherrapunji. The only member of the genus previously recorded from the Khasia,—widely distributed, known also from Simla, Kumaon, Darjiling, Sarawak and Ceylon (Pattipola, 6,000 feet).

Sciara sp. A female in bad order, from Laitlyngkot, I cannot identify. It runs down to *parallela* in Brunetti's key,—in other words, it possesses no distinctive characters of any kind.

**Mycomyia ferruginea.* (Brun.) Four specimens, all from Shillong, two taken in pine forest. Known also from Darjiling, Calcutta and Peradeniya. On the wing it is distinctly a hymenopterous mimic.

**Allactoneura cincta.* (de Meij.) Specimens from Nongpoh, Shillong and Cherrapunji. The species is widely distributed, being known from Nepal and Ceylon to Formosa. Previously recorded in Assam from Sylhet and Kobo (N. E. frontier).

Exechia brevicornis. (sp. nov.) The unique type in pine forest, Shillong.

Exechia longicornis. (sp. nov.) Very like the preceding, but the antennæ are much longer; both species being known from males. Shillong, in deep shade.

Exechia flava. (sp. nov.) Cherrapunji. This is very near Brunetti's *basilinea* from the Himalaya, but is, I think, distinct. The uncompressed abdomen is hardly in accord with the other species of the genus known to me.

Exechia mirastoma. (sp. nov.) The unique type of this species, the extraordinary mouth parts of which, when understood, will doubtless involve the erection of a new genus for its reception, was taken in pine forest, Shillong. It is greatly to be hoped that sufficient material will come to hand to enable the structure to be properly made out. I do not care to mutilate the unique type.

The discovery that this genus, hitherto only known as Indian on one species from the Himalaya, is common in the Khasia and Ceylon, is a better proof of community of fauna than many specific identities.

Mycetophila khasiensis. (sp. nov.) The unique type from Shillong, on a window.

There is nothing remarkable in the discovery of so many new species of this family,—which owing to the small size and ordinary appearance of most of its members has been very litte collected.

CHIRONOMIDÆ.

In spite of Kieffer's work in this family, 'the fringe,' as Dr. Annandale has remarked, 'has merely been touched,' in regard to Indian forms. None have been hitherto recorded from the Khasia, though some Sylhet species have been described, and our knowledge is mainly confined to the Ganges Delta, with a certain number of species from Ceylon. Kieffer's work is extraordinarily difficult to follow, and personally I seldom feel sure of even generic definitions made thereby. Hence, one naturally pays less attention to members of this family than would otherwise be the case. For this reason even my Ceylon collections are less complete in this than in any other family, Cecidomyids not excepted. During the tour only seven species were obtained, which seem to belong as follows:—*Chironomus*, two species, both Shillong; (?) *Cardiocladius*, two species, one from Shillong, the other from Nongpoh, but both differing from an unnamed Ceylon species in my collection provisionally assigned to that genus by the immensely swollen and spined fore femora; *Procladius*, one species, Shillong. From pupæ in a rotten shoot of bamboo, which had died when a few inches above ground, at Shillong, three females of a *Forcipomyia* and four males of a (?) *Metriocnemus* were bred, emerging at Pusa in November, though they would probably have overwintered in the pupal stage if left at Shillong. Though both species are represented by specimens of a single, and opposite sex, there is at least no doubt that two species of very different genera are present. None of these species are represented in my Ceylon collections.

PSYCHODIDÆ.

Yet another family entirely unknown from the Khasia, where they do not appear to be common, as only two species were captured.

Pericoma metatarsalis (Brun.) var. *khasiensis*, nov. In the description I have given reasons for considering these specimens at least a good variety of this western Himalayan species. They were abundant, running in circles in

the usual fashion, on broad leaves on a hedge at Mawphlang, which was the only occasion in which the family was at all in evidence. Only a few survived capture in sufficiently good state to pin, as owing to rain my net was not in a fit state for taking such delicate insects.

Pericoma sp. A single male from Shillong represents, apparently, a new species near *impunctata* (Brun.), but I do not like to describe in this family from unique specimens, as dissection is essential if structure is to be properly made out.

A small species, of which no specimens seem to have survived, was noted as attracted to freshly dropped cowdung at Shillong, and may possibly have been *Psychoda nigripennis* (Brun.), which breeds in this material. None the less, the apparent absence of this genus is interesting, as in Ceylon it is much more prevalent than *Pericoma*, being represented in my collections from the Island in the proportion of five to one, and recorded in Brunetti's recent catalogue in the proportion of four to one.

CULICIDÆ.

Though the mosquitoes of Assam are fairly well known, it would appear that serious collections have been made only in Sylhet and the Lushai Hills, for from the Khasia I have only been able to find a single species definitely recorded. A hurried collecting tour devoted to the order in general is not likely to furnish anything like a complete tally of the mosquitoes present even at the time of one's visit, but none the less the collection made proves a most interesting one, and has resulted in adding two species to the Indian list. The Malayan element in the fauna is, as might be expected, most marked. The collection was worked out at Kasauli by Major Christophers, C.I.E., I.M.S., to whom my best thanks are due. The most productive locality was the small wood, referred to previously, at Cherrapunji, and it is at this station alone that my diary notes mosquitoes troublesome at night. This, of course, refers to the Hills; mosquitoes at Gauhati made the night a purgatory only comparable, in my experience, to a bad mosquito night at Kanthalai, near Trincomali.

**Anopheles gigas.* (Giles) Dumpep, in dâk bungalow, at dusk. This is the only species heretofore recorded.

**Anopheles maculatus.* (Theo.) A gorged female in bedroom, after a very cold night on October 20th, Shillong.

Armigeres apicalis. (Theo.) In wood, Cherrapunji.

**Armigeres obturbans.* (Wlk.) One male, Shillong.

**Stegomyia trilineata.* (Leic.) Many specimens, in deep jungle at the mouth of Maosmai Cave, near Cherrapunji. It was noticed that they attacked

our Khasia guides much more than we suffered ourselves, which is contrary to what one would expect.

**Ochlerotatus ostentatio.* (Leic.) Cherrapunji. A Malayan species also recorded from Peradeniya.

Ochlerotatus pulchriventer. (Giles). Cherrapunji. Hitherto only known from Naini Tal.

**Ochlerotatus vexans.* (Meij.) Cherrapunji, Dumpep and Shillong, several specimens. The species apparently ranges from Canada to Fiji, but not into Africa.

**Culex mimeticus.* (Noë) Shillong and Cherrapunji. These specimens are the true *mimeticus*, and not the tropical *mimulus*, Edw.

**Culex tritæniorhynchus.* (Giles) A female from Shillong, in bedroom, and a male from Gauhati, in jungle, identified as this species by Major Christophers, do not appear to me to be conspecific with specimens identified as the same species from Ceylon, having the wing scales broader, and leaning more towards *sitiens*, Wied. Our knowledge of the very difficult group of *Culex* comprising those species with a banded proboscis is still insufficient.

Culex univittatus. (Theo.) One male, Shillong. This African species had previously been recorded from Singapore, and now comes on to the Indian list for the first time. Its occurrence in such a remote locality absolutely disproves any idea that it is a recent introduction to Asia by shipping, which the Singapore record would easily warrant.

**Culiciomyia viridiventer.* (Giles) Five males, resting in a flooded pit latrine at Laitlyngkot. I feel sure that there is a *mélange* of species under this name. Bred originally at Naini Tal in a waterfall, it is a far cry from such a habitat to a flooded latrine, or a water butt, from which I bred it in Ceylon. I cannot conceive of any single species with such diverse tastes.

**Tæniorhynchus brevicellulus.* (Theo.) Captured at Gauhati.

Tæniorhynchus ochraceus. (Theo.) A pair from Cherrapunji. This species was captured by Mrs. Bainbrigge Fletcher, who thus adds to our fauna one of the most beautiful species of the family, known previously only from Kuala Lumpur. This is one of the most interesting captures of the whole tour.

Mansonioides annulipes. (Wlk.) Taken at Burnihat and Gauhati. A Malayan species hitherto recorded in the Indian sub-region only from Calcutta.

**Mansonioides uniformis.* (Theo.) A female in jungle, Gauhati.

At neither Gauhati nor Burnihat did I notice any *Pistia stratiotes.*

**Aedes butleri.* (Theo.) Gauhati. A Malayan species recorded also from Colombo. Identified with a certain amount of doubt.

Uranotænia testacea. (Theo.) Three females in bed of stream in jungle, Gauhati. Hitherto known only from the Malayan sub-region, and recorded in our fauna only from the Dawnat Range, Tenasserim.

DIXIDÆ.

Dixa montana. (Brun.) A male taken on our last day in the hills, at the Crinoline Falls, Shillong, proves to belong to this species, previously known only from the Simla Hills, where it appears common.

BIBIONIDÆ.

Crapitula melanaspis. (Wd.) Shillong, Dumpep and Cherrapunji. Previously recorded from the Khasia. It was very common around heaps of old, rotted cowdung, in which it was breeding, mature larvæ and pupæ being found in the dung and in earth close by.

Plecia tergorata. (Rond.) Cherrapunji. Previously recorded from the Khasia.

Dilophus gratiosus. (Big.) Three specimens, from Shillong. Not previously recorded, though it occurs from the western Himalaya to Yunnan.

SIMULIIDÆ.

Simulium aureohirtum. (Brun.) A male of this widely, but erratically, distributed species, which was previously known from Umling in these hills, was taken at Shillong hovering before flowers of a cultivated composite.

Simulium metatarsale. (Brun.) A male from Shillong. Brunetti hardly sufficiently emphasizes the extraordinary development of the hind metatarsus of this species, which is so vastly in excess of the quite sufficiently remarkable incrassation of the joint in the other Indian species. Hitherto only known from the unique type from Kurseong.

TIPULIDÆ.

The Tipulidæ of the Khasia are better known than most other families, whilst most of the species collected by Dr. and Mrs. Kemp in the Garos, on the same range further to the west, bring to our knowledge species which will probably be found, ultimately, on the Khasia also. The Ceylon element in the fauna is very small, showing how local are these insects.

Ctenacroscelis dives. (Brun.) A male was taken on the first day's collecting at Shillong, and no further specimens were seen. It was apparently too late in the season for the occurrence of these giant forms. This species has hitherto only been known from the Darjiling District.

Tipula fumifasciata. (Brun.) Shillong and Laitlyngkot. A Chinese species, hitherto only recorded in our region from Manipur, this record extends its distribution a good deal further westwards.

Tipula himalayensis. (Brun.) Common at Shillong, taken also at Mawphlang and Dumpep. Previously recorded. The legs of my specimens are rather more yellow than the description indicates, and the preapical femoral yellow rings are indistinct, especially on the fore legs.

Tipula quadrinotata. (Brun.) A female from Cherrapunji. Known previously from Darjiling and Manipur, its occurrence on the intervening range was to be expected.

Tipula tenuipes. (Brun.) A single specimen from Shillong. Previously recorded from Sylhet only.

Tipula sp. Two females from Laitlyngkot apparently represent a new species near *tenuipes,* but are in too bad order to describe.

Pachyrrhina consimilis. (Brun.) Laitlyngkot and Cherrapunji. Distributed from Peshawar to the Khasia.

**Pachyrrhina javensis.* (Dol.) A pair from Shillong. A Malayan species also found in Ceylon. Previously recorded from the Khasia and the Garos.

Pachyrrhina serricornis. (Brun.) Shillong, Mawphlang, Laitlyngkot, Dumpep and Cherrapunji. Common everywhere. Occurs from Lahore to Yunnan, and possibly also in Japan.

Dicranomyia cuneiformis. (de Meij.) A male from Cherrapunji. Known previously from Java, North Kanara and Tenasserim.

Dicranomyia nitidithorax. (sp. nov.) The unique type from Shillong.

Dicranomyia pulchripennis. (Brun.) Shillong, two females previously recorded.

Dicranomyia sordida. (Brun.) Common, taken at Shillong, Cherrapunji, Dumpep and Laitlyngkot. Previously only recorded from the Darjiling District.

Geranomyia pulchripennis. (Brun.) Cherrapunji, known previously from Shillong.

**Geranomyia semistriata.* (Brun.) Four specimens, from Shillong, whence it has been previously recorded, as also from Cherrapunji by Kemp. Occurs at the four-thousand-foot level in Ceylon (Maskeliya).

Atarba flava. (Brun.) Cherrapunji. Hitherto only known from Darjiling where it is common in the autumn (Brunetti).

Molophilus inconspicuus. (Brun.) A specimen from Shillong, and another taken on grass at mile-post 25 on the Cherrapunji road, appear to be this species, which is known from the Himalaya and Travancore.

Erioptera grandior. (Brun.) Dumpep. Previously only recorded from Simla.

Acyphona indica. (sp. nov.) The unique type from Shillong. The genus occurs in the East in Java, but has not hitherto been found in the Indian sub-region.

**Gonomyia conjugens.* (sp. nov.) The types are from Shillong and Matale, in Ceylon, respectively.

Gnophomyia strenua. (Brun.) A single specimen from Shilliong supplements the unique type from Darjiling.

Gnophomyia sp.—A male from Cherrapunji lacks a head and is unidentifiable.

**Trentepohlia trentepohlii.* (Wd.) A female from Gauhati of this widely distributed species, which was not seen in the Hills.

**Conosia irrorata.* (Wd.) This widely distributed species has apparently not been recorded hitherto either from Ceylon or the Khasia, where a single specimen was taken at Shillong. In Ceylon it occurs, but rarely.

Amalopis novempunctata. (sp. nov.) The unique type of this very beautifully marked species was taken at Shillong.

Limnophila fletcheri. (sp. nov.) Several specimens of this new species, from Shillong and Cherrapunji.

Limnophila fusca. (Brun.) A male from Cherrapunji. Hitherto only known from Darjiling District.

Limnophila multipunctipennis. (sp. nov.) Two examples, Shillong.

Eriocera maculiventris. (Brun.) A female from Gauhati, resting on a tree in scrub jungle. Known only from the Garos, at a considerable elevation, hitherto.

Eriocera plumbolutea. (Edw.) A male, flying over a stream, Shillong. The unique type is also from the Khasia.

Eriocera semilimpida. (Brun.) Shillong, in marshy ground opposite the Convent. Apparently confined to the Khasia.

STRATIOMYIDÆ.

Ampsalis longispinus. (Brun.) A male of this beautiful Tenthredinid mimic flew into the verandah of a bungalow on a dull afternoon, Shillong. Previously recorded from Shillong and Darjiling District.

**Negritomyia maculipennis.* (Macq.) A female from Nongpoh of this species, which has hitherto been recorded only from Ceylon and Coorg in our region, though known also from the Philippines, Moluccas and Papua.

Ptecticus aurifer. (Wlk.) A male from pine forest, Shillong; the species extends from Masuri to Borneo. In flight is extremely pseudaposematic.

**Sargus mactans.* (Wlk.) Shillong and Gauhati, four examples. A somewhat widely distributed species. It might be noted that Howlett's figure in *Indian Insect Life* (Plate LXI, fig. 3), is of this species, and not *metallinus* F., as stated.

**Michrochrysa flaviventris.* (Wd.) A female from Burnihat, flying round a pond in heavy shade, belongs to this widely distributed species.

As was to be expected, the Stratiomyidæ collected represent the family but poorly. It is far more abundant in the Plains.

TABANIDÆ.

In spite of the large number of species recorded from the lower ranges of the Khasia northern face, Tabanidæ seem extraordinarily scarce on the Shillong plateau. No specimens were taken during the tour and none have previously been recorded, though I have seen one or two from Shillong in the Pusa collection of this family, which has not yet been worked out.

BOMBYLIIDÆ.

**Exoprosopa insulata.* (Wlk.) A female of this widely distributed species was taken flying slowly over grass on the last day of the tour at Shillong, probably just warmed out from the chill of the previous night.

Exoprosopa latipennis. (Brun.) Eight examples of this beautiful species, which is apparently confined to the Khasia, were taken hovering over a grass bank by the Survey Department offices at Shillong, on 8th October. The species was seen nowhere else and on no other occasion, and I understand that the Imperial Entomologist has taken it just here in previous years.

What was probably a *Systropus* was seen, and missed, at Dumpep, where the high wind that was blowing on the day of our visit made everything very wild.

THEREVIDÆ.

Therera flavolineata. (Brun.) This handsome species, which seems to be entirely confined to the Khasia, is represented by a female from Laitlyngkot, taken flying round *Prunus nepalensis.*

ASILIDÆ.

It is as yet impossible to identify Indian species of this family, though Mr. Brunetti is at present engaged in working them out. Of the eleven species

taken, ten belong to the Asilinæ, and one to the Dasypogoninæ, the other two sub-families not being represented. Of the Asilinæ, four species belong to *Ommatius*, (*s. l.*) three to *Machimus*, two to *Neoitamus* or an allied genus, and one to *Philodicus*, being very near a Ceylon species of that genus belonging to the four-thousand-foot level, differing in the number of posterior dorso-central bristles only. One sp. of **Ommatius*, taken at Shillong, is actually conspecific with a Ceylon species occurring in the foot hills. One of the *Neoitamus* species was taken with prey, a Lymantriad moth, at Shillong, and was also taken at Nongpoh, which is a wide distribution in elevation. The family was most abundant, proportionally, at Dumpep, where possibly the grass land formation nourished an Orthopterous fauna yielding suitable prey. The high proportion of species belonging to *Ommatius* is noteworthy.

EMPIDÆ.

**Hybos apicis.* (Brun.) A male from Nongpoh belongs to this species, which, although only recorded from Tenasserim, is common at 1,300 feet in Ceylon.

Hybos bisetosus. (Bezzi.) Five males, from Shillong, appear to be this species, described from the Western Ghats at 2,600 feet, but the tomentum on the thoracic depression is brilliant gold, not grey, as stated. The tips of the hind femora are much more blackened than Brunetti's key (but not Bezzi's description) would lead one to expect, and the former author's *tenuipes*, concerning the validity of which he expresses a doubt, is probably good.

DOLICHOPODIDÆ.

I have postponed the working out of my entire collection in this family until the results of Becker's examination of the Zoological Survey's collection have been published. Of the eight species of the family taken during the tour four belong to *Psilopus*.—(*one common to Gauhati and Ceylon at all levels from 500 to 4,000 feet), one common to Shillong and Gauhati, and the other two represented by a few specimens of apparently localized species found at Mawphlang and Gauhati respectively. The genus seems poorly represented on the Hills of North India as compared with Ceylon, where it is predominant, being even more scarce in Darjiling collections received from Mr. Shaw of the Govt. Cinchona Plantations, Mungpu. Of the remaining species, two belong to *Dolichopus*, one represented by a single Gauhti specimen, the other, which I know also from Mungpu, from Shillong and Dumpep. A **Diaphorus* from Gauhati occurs in Ceylon, and with a single specimen of a *Sympycnus* from Gauhati completes the tale of a family which

in any Ceylon collection made over the same period and elevation would be far more abundantly represented. As it is, the majority of the species came from Gauhati, and not the Hills proper.

PHORIDÆ.

Aphiochæta flavifacioides, sp. nov. The unique type, from Cherrapunji, represents the only specimen of the family obtained, but as special methods involving breeding are required for its adequate investigation, this is not to be wondered at.

PLATYPEZIDÆ.

**Platypeza argyrogyna*. (de Meij.) A long series from Shillong and Gauhati. The Shillong specimens are extremely large as compared with those taken in Ceylon, but the difference is more apparent in life than in the box. The Khasia form is *obscura* (Brun.), but at Gauhati the form with yellow first and second tarsal joints makes its appearance. Neither shows the white shimmer on the thorax to the extent Ceylon specimens do.

PIPUNCULIDÆ.

An undescribed *Pipunculus*, from Dumpep, represents this family. As in this, so in the two succeeding ones, the long delayed publication of Brunetti's third 'Fauna' volume on the Order has to be awaited for determinations to be made of any but the most well-known species.

SYRPHIDÆ.

This family is, undoubtedly, the most prominent feature of the fly fauna of the Khasia. To any one who, like myself, is only acquainted in the East with the sparse and unremarkable representatives of the family in South India and Ceylon, the abundance of handsome species comes as a revelation.

(?) *Paragus* sp. A pair from Shillong appear to belong to an undescribed species in this genus.

(?) *Pipiza* sp. A female from Shillong.

**Syrphus balteatus*. (de Geer.) As common here as elsewhere. Specimens from Shillong, Dumpep, Laitlyngkot and Cherrapunji.

Syrphus confrater. (Wd.) Two females from Cherrapunji appear to be this species, which is widely distributed in North India.

**Syrphus ericetorum*. (Fb.) Another widely distributed species, represented by a pair from Shillong and a male from Gauhati. The Shillong female was flying in company with *Exoprosopa latipennis*.

Syrphus spp. Two species, one represented by a female from Dumpep, the other, which I also have from Mungpu, by a pair from Shillong.

**Sphærophoria javana.* (Wd.) Three males from Shillong.

Sphærophoria nigritarsis. (Brun.) A pair from Shillong and two females from Dumpep are of this species.

Sphærophoria viridænea. (Brun.) A female from mile-post 25 on the road to Cherrapunji, amid grass downs.

**Sphærophoria* sp. A very common Ceylon form, represented by two females from the marsh in front of the Convent, Shillong, I cannot identify with any of the described species. It seems to belong to an intermediate between Brunetti's 'forms 1 and 2.' I have seen the same species from Banhar, in North Bihar. In all these specimens the last two joints of the hind tarsi are dark, a character of which Brunetti makes no mention.

Sphærophoria sp. A single female from Shillong, apparently represents yet another species, or form, in this genus, in which it is interesting to note that the common and widely distributed *scutellaris*, Fb., is not represented. Two species of the genera with pedunculated abdomen allied to *Baccha* occur, one from Shillong, Cherrapunji and Dumpep, the *other from Shillong only, but represented in my collection by specimens from various localities in Ceylon, and from Pusa.

(?) *Orthoneura* sp. Two males from Shillong, and two females from Cherrapunji apparently belong here.

(?) *Melanostoma* spp. Four species, one from Shillong only, *two from Cherrapunji in addition, the *fourth from both places and Mawphlang, apparently belong here. The three last mentioned are all found in Ceylon, and I have two of them from North Bihar also.

Rhingia sp. An undescribed species from Shillong and Cherrapunji, both females. At the latter place the specimen was hovering before the door of the Circuit House, and was taken for a Bombylid exploring the key hole.

Eristalis tenax. (L.) As common at Shillong as it appears to be at Darjiling. A male from Laitlyngkot.

Eristalis spp. Four species, which I cannot identify. *One of them I have also from Ceylon and Banhar, another, very common at Shillong, also from Darjiling. The other two are not represented from elsewhere in my collection.

Megaspis chrysopygus. (Wd.) A male, on flowers of a composite, in a garden, Shillong, was the only one seen. Being on a mere 'after tiffin' stroll neither of us had a net handy, and its capture by hand by the Imperial Entomologist was no mean feat! A wonderfully striking species.

Megaspis errans. (Fb.) A male from Shillong.

**Megaspis zonalis.* (Fb.) A female of this beautiful species from Shillong. It occurs, but rarely, in Ceylon also.

Eumerus spp. Two species of this genus from Shillong, but neither was at all common, or agrees with species from other localities in my collection.

CONOPIDÆ.

Physocephala sp. A male resting on a blade of grass in the swamp, Shillong, belongs to a species which I also have from Sukna, at the foot of the Darjiling Himalaya, and is the only specimen of the family collected during the tour.

ACALYPTRATA.

Our knowledge of the Indian families in this sub-order is more than incomplete –it may be said to be non-existent. Here and there a genus, and one family, the Trypetidæ, have been worked out, but until India obtains the services of another Brunetti to blast a track through the jungle of forms, obfuscated as it is by the misdirected efforts of Walker and Bigot, but little progress can be expected. The work cannot be done in India. In the Nematocera we are dealing with families most of whose species are of fair size and possess noticeable separatory characters, probably also a somewhat restricted distribution, but here we reach a mass of obscure and small species which are often either of wide distribution or closely allied, and the described species of which are in all probability entirely wrongly allocated as to genera. As a pre-requisite to further study, the elucidation of the types of the heretofore described species is essential, and this can only be done in Europe. A prominent species, here and there, may be safely identified from literature, the remaining descriptions only represent an inchoate mass. It is peculiar that, so far as my experience goes, jungle country is much less productive of species than is cultivated, but this may really be due only to their normally small size rendering them inconspicuous and overlooked in wild surroundings. In the present collection not very many species were obtained, and all I can attempt, save in Trypetidæ, in which Bezzi's working out of the Zoological Survey's collection forms a ground work, is to indicate such Ceylon affinities as I have found. It is useless to run any particular species down to a modern genus and, finding that genus unrepresented in the East, to thereupon describe the species as new. Walker has probably already described it several times and allocated his various synonyms to some totally unlikely genus, probably that from which the family takes its name. I write from my experience in working out the Muscidæ in collaboration with Major Patton, I.M.S., and there is no reason

to suppose that Walker was any more careful in Acalyptrata than in the higher Muscoids.

BORBORIDÆ.

Represented by a single species from Laitlyngkot and Mawphlang.

CHLOROPIDÆ.

Seven species, one common.

EPHYDRIDÆ.

Two species, apparently belonging to *Notiphila*, are represented by single specimens from Laitlyngkot and Dumpep respectively. A *third species, belonging to a genus not included in 'Williston'; is found in Ceylon and at Cherrapunji.

DROSOPHILIDÆ.

A (?) **Leucophenga* sp. I have from Shillong, Mungpoo and Ceylon, and of a species of **Stegana*, which I have bred from beneath decaying *Hevea* bark in Ceylon. I obtained a single specimen at Cherrapunji. Five other species were taken *one of which also occurs in Ceylon.

AGROMYZIDÆ.

Three species, *one of which is also found in Ceylon.

SEPSIDÆ.

Of the three species obtained,* two are also known to me from Ceylon.

MICROPEZIDÆ.

* *Texara dioctrioides*. (Wlk.) A single specimen from Mawphlang; the species is not uncommon in Ceylon, and was originally described from Celebes. It is probably a Braconid mimic.

Calobata spp. Two closely allied species which mimic an Ichneumonid of the *Lissonata* group. The Shillong species, with black antennæ, I have not seen from elsewhere; *the Gauhati species, with yellow antennæ, is common in Ceylon. These are the most wonderful mimics known to me; the use of the front legs to imitate the vibrating, white-ringed antennæ of the hymenopteron is marvellous.

ORTALIDÆ.

**Stenopterina ænea*. (Wd.) A pair from Nongpoh of this common scatophilous species, which apparently does not ascend the hills further, although I have it from 4,000 feet in Ceylon.

No other species of this very large family were taken. It is apparently as poorly represented here as it is in Ceylon, from which, after years of collecting, I only possess ten species.

DIOPSIDÆ.

Teleopsis spp. Three species, one from Cherrapunji, two from Gauhati, are so closely allied that they may possibly be only forms of a single variable species. All are represented by single specimens, and I have seen nothing like them from elsewhere.

SAPROMYZIDÆ.

Thirteen species, of which *five are also found in Ceylon. One of these is from Gauhati, one, (a *Lonchæa*), common to Gauhati, Shillong and N. Bihar, the others from Shillong and Cherrapunji. Another Gauhati species is also found at Pusa. Of the remainder, six belong to the higher levels, one to the Plains at Gauhati.

TRYPETIDÆ.

**Chætodacus caudatus.* (Fb.) A single specimen of this widely distributed species from Shillong.

Chætodacus scutellaris. (Bezzi.) Two females from Shillong, whence the species has already been recorded. Occurs from Almora to the Shan States.

Chætodacus scutellarius. (Bezzi.) Two females from Shillong belong to this species, hitherto only known from Mysore.

Tæniostola vittigera. (Bezzi.) Two pairs, resting on the underside of leaves in the bed of a stream overhung with jungle, Gauhati. This beautiful species is apparently confined to Assam.

Rioxa vaga. (Wd.) A female taken in company with the previous species appears to be this, though in some respects the wing agrees with Walker's description of his *mutyca*, possibly the two are but varieties of a single species. The latter is recorded from Sadiya, at the head of the Brahmaputra Valley.

Elaphromyia pterocallæformis. (Bezzi.) A single specimen from Cherrapunji of this species, hitherto known only from the Western Himalaya. It mimics a homopterous insect.

Tephritis tribulicola. (sp. nov.) Breeds in the gigantic thistle which is one of the features of the Shillong flora. Specimens from there and Mawphlang. The thistle seems to be confined to the same country as *Pinus khasiana*, hence the non-appearance of the fly at Cherrapunji and Dumpep.

It will thus be seen that, in the only Acalyptrate family in which accurate determination is possible, only one widely distributed species is common to the Khasia and Ceylon. That the known distribution very imperfectly represents

the actual facts is shown by the breeding from flower heads of *Gonicaulon glabrum* at Nagpur of *Craspedoxantha octopunctata*, (Bezzi.), a species hitherto confined to its unique type from Tenasserim, a district about as remote in character from the Central Provinces as any other in the Empire. More careful collecting will probably reveal many other species besides those which are pests of cultivated plants to be of wide distribution.

ANTHOMYIDÆ.

This is the most impossible family of all the sub-order, the very English species are only now being cleared up, and individual species are known to be of extraordinarily wide distribution. Twenty-six species were taken on the tour. Of them, a **Lispa* is common to Ceylon, Mungpu and Shillong, another *species, of undetermined genus, I have from Ceylon, Pusa and Shillong; *another from Ceylon at 4,000 feet, Burnihat, Laitlyngkot and Dumpep, also from Coonoor; *another from the low country of Ceylon, Gauhati and Cherrapunji. Of the remaining species twenty are from high levels, two of them occurring at about equal elevations on the Nilgiris, and two from the Plains.

CALYPTRATA.

Muscidæ.

The Indian species of this family are now undergoing revision and elucidation by Major Patton, I.M.S., and myself, and this work is still far from complete. It is not possible, therefore, to name everything taken on the tour, or to guarantee that the name given a species in these notes will not be supplanted later on by the discovery of an older one, but the majority of the species have been identified with some description. The distribution in the family is so wide that the absence of the commoner species from any station is of greater interest than their presence, denoting the operation of some as yet uncomprehended factor for that species. For example, a special search was made on the Khasia for *Musca cingalaisina* (Bigot), (*Philæmatomyia indica*, Awati), without result, and although the species is known from as far North as Delhi it apparently fails to reach the Khasia, much more closely allied though this is to Ceylon than is the Gangetic Plain.

All determinations, except in Rhiniinæ, have been gone over by Major Patton.

**Musca nebulo.* (Fb.) The common housefly at Shillong, Mawphlang, Laitlyngkot and Cherrapunji. Its replacement in this office at Gauhati by the next species is of peculiar interest.

Musca sp. *incert.* (P. & C.) This species, which still lacks[1] an exact determination, was the common fly in the Gauhati bazaar on the date of our visit. This is unusual, as the species does not commonly function as a house-fly.

**Musca humilis.* (Wd.) Shillong, Nongpoh and Gauhati.

**Musca centrosa.* (Wd.) A single male from Nongpoh. Searched for in vain at Shillong.

Musca (?) *setigera* (Awati). (*convexifrons* P. & C., *nec* Thoms.) A single male from Mawphlang of this interesting species, the name of which is still in doubt.[2]

**Musca gibsoni.* (P. & C.) Shillong, Mawphlang, Dumpep, Cherrapunji and Nongpoh. Usually more or less confined to the Hills in India, although it reaches sea level in Ceylon.

**Musca pattoni.* (Aust.) Shillong, common. A pair from Nongpoh.

**Musca bezzii.* (P. & C.) Shillong, Laitlyngkot and Cherrapunji. Common.

**Musca lineata.* (Brun.) A single female from Shillong.

**Musca crassirostris.* (Stein) Cherrapunji, Nongpoh and Gauhati.

Pyrellia sp. A large larviparous species from Gauhati, Shillong, Mawphlang, Laitlyngkot and Cherrapunji. Occurs also in the Darjiling District.

**Pseudopyrellia* (?) *lauta.* (Wd.) Cherrapunji, Nongpoh and Gauhati. Another very common species which is absent from Shillong and the higher levels.

**Bdellolarynx sanguinolentus.* (Aust.) Three specimens from Shillong.

**Stomoxys bengalensis.* (Pic.) A single specimen from Shillong appears to be this species.

**Stomoxys calcitrans.* (L.) Everywhere along the road from Gauhati to Cherrapunji.

**Lyperosia exigua.* (de Meij.) A male from Gauhati belongs to this widely distributed species, which was not found in the Hills.

Calliphora aucta. (Wlk.) Described by Walker as a '*Musca*,' this species has never heretofore been recorded from any certain locality. One specimen, at food, Dumpep. It is larviparous.

**Chrysomyia megacephala.* (Fb.) Cherrapunji, Nongpoh and Gauhati. Not seen at Shillong although naturally a species which, if present, intrudes itself.

Chrysomyia pinguis. (Wlk.) Several specimens from Shillong. Occurs also on the Nilgiris.

Chrysomyia putoria. (Wd.) A pair from Shillong.

[1] Since described by Patton (*Ind. Journ. Med. Res.* X 71-73; July 1922) as *Musca incerta*; but, as that name is an absolute homonym of *Musca incerta*, Walker (1856), this fly is still without a valid name.—T. B. F.

[2] According to Patton, this is *M. albiceulata* Macq.—T. B. F.

Lucilia inducta. (Wlk.) One of Walker's 'green and gold' *Muscas*! Common at Shillong, one specimen from Laitlyngkot. Occurs in the Eastern Himalaya and the Nilgiris.

**Lucilia* sp. An unidentified species, larviparous in human excrement, was obtained at Gauhati. I know it from up to 1,300 feet in Ceylon, and it has been taken at the foot of the Nilgiris. It apparently does not attain a high elevation.

**Borbororhinia pubescens.* (Towns.) The first female to come to hand was taken by the Imperial Entomologist on a flowering tree in the Club compound, Shillong. Described from Cochin, it is not very rare in Ceylon. This is the first record outside the Ceylonese Province.

**Chloroidia flavifrons.* (Towns.) A single specimen of this, the most beautiful of Indian Muscidæ, was seen, and lost, at Shillong. Fairly common at times in Ceylon. Described from Mergui and Cochin, it is probably a Malayan species entering the Empire at the two ends which have affinities with that sub-region.

Idiella euidiellοides. (sp. nov.) Types and another specimen from Shillong, the former taken on a flowering tree by the Imperial Entomologist.

Euidiella quadrinotata. (Big.) Four specimens from Shillong and Dumpep appear to be this Bornean species, which I have also from Mungpu. The basal pair of yellow abdominal spots is obsolescent.

It is interesting that among the wealth of species in this sub-family obtained at flowers in Shillong, the commonest of all, *Euidiella discolor* F., was not obtained.

**Strongyloneura nepalana.* (Towns.) A male from Shillong. This widely distributed North Indian species is common in Ceylon.

Strongyloneura viridana. (Towns.) A pair from Shillong. Known also from Calcutta and Sadiya.

Synamphoneura cuprina. (Big.) A pair from Gauhati appear to be this Malayan species, which I have also from North Bihar. Previously recorded from Assam.

Pollenia sp. Four females from Shillong, two taken sucking Aphid honey-dew, apparently represent a new species near *rudis*, but I refrain from describing them at present.

Polleniopsis (?) *pilosa.* (Towns.) Four specimens of what I take to be this species, but Townsend's specific description is so inadequate that consultation of his type is necessary, and this is not possible at present. The type is a male and these specimens are all females and differ by the legs being black, and in other minor points.

A *Bengalia* was seen, but lost,—through a hole in the net. The numerous burrs which the Shillong flora produces are not conducive to undamaged nets ; in spite of repairs I used four in the three weeks !

SARCOPHAGIDÆ.

Another family in which type elucidation is essential to any progress. With fourteen species of Walker's, two of Desvoidy's and three of Macquart's (to say nothing of others by workers less reckless in description), which require homologizing, nothing more can be said about the two species of *Sarcophaga* obtained than that *one is as common in Ceylon as at Shillong and Cherrapunji, and the other species, also from the same Khasia localities, is represented in my collection by that great desideratum in this genus, a pair *in cop.* from Pusa.

DEXIIDÆ.

Of the eight species taken, *two are common to the Khasia and Ceylon. One of these, (?) *Prosena* sp., occurs from sea level to 4,000 feet in Ceylon, and at Shillong and Cherrapunji, where it abounded. It is very fond of resting on pine trunks at Shillong. Of the remaining species, five are from Shillong and the higher elevations, one from Gauhati. One of the former is a wonderful hymenopterous mimic in black and yellow, and was taken flying slowly, which is most unusual in this family, over a stream near the Fruit Farm at Shillong. Slow flight is a sure sign of effective protection.

TACHINIDÆ.

Unless a worker who is capable of comprehending the writings of Brauer and von Bergenstamm and of Townsend can be found to devote his whole time to the Indian species of the family I fear that the present generation of entomologists will see but little progress made in our knowledge of these important parasites. It is a matter of extreme difficulty, save in the case of a few well-marked species, to decide whether any two specimens are, or are not, conspecific. My captures appear to belong to twenty species, only one of which, a beautiful yellow *Bombyliomyia* from Laitlyngkot amid long grass, I can with any certainty refer to even a genus, and to conspecificness with numerous other specimens from Mungpu at various elevations between two and five thousand feet. The other species are represented by one to three specimens each, mainly from localities of equal elevation, but one species was taken at Shillong and Nongpoh. The single species from Gauhati was not seen higher up. One Shillong species, with black thorax and wings and flattened, orange abdomen, is in flight a Reduviid mimic. None of the species have any affinity with those known to me from Ceylon, or, with the exception quoted, from the Eastern Himalaya.

PUPIPARA.

The common *Hippobosca maculata* (Leh.) was not seen anywhere, which is most surprising.

No shooting of bats was done, and so the *Nycteribiid fauna* is unrepresented.

The captures in each family are summarized below. It will be seen that the proportion of species occurring common to the faunas of the Khasia and Ceylon is approximately the same for each of the five (out of the six), great divisions of the Order which were obtained. The community of type thus indicated is fairly high, and may be said to confirm the impression which the tour was designed to verify; but, until the Palnis, Nilgiris and Chota-Nagpur Hills have been subjected to similar investigation, whether this similarity is one of station or of region, must remain in doubt.

It is greatly to be hoped that these localities may be similarly explored.

Family	No. of spp. captured	No. of spp. also known from Ceylon	Percentage of spp. common to both areas
Cecidomyidæ	1	..	..
Mycetophilidæ	16	3	19
Chironomidæ	7	..	..
Psychodidæ	2	..	..
Culicidæ	18	12	75
Dixidæ	1	..	..
Bibionidæ	3	..	..
Simuliidæ	2	..	..
Tipulidæ	31	5	16
NEMATOCERA	81	20	24
Stratiomyidæ	5	3	60
Bombyliidæ	2	1	50
Therevidæ	1	..	..
Asilidæ	11	1	9
Empidæ	2	1	50
Dolichopodidæ	8	2	25
Phoridæ	1	..	..
BRACHYCERA	30	8	27
Platypezidæ	1	1	100
Pipunculidæ	1	..	..
Syrphidæ	28	8	28
Conopidæ	1	..	..
ASCHIZA	31	9	29

Family	No. of spp. captured	No. of spp. also known from Ceylon	Percentage of spp. common to both areas
Borboridæ	1	..	..
Chloropidæ	7	..	..
Ephydridæ	3	1	33
Drosophilidæ	7	3	43
Agromyzidæ	3	1	33
Sepsidæ	3	2	67
Micropezidæ	3	2	67
Ortalidæ	1	1	100
Diopsidæ	3	..	..
Sapromyzidæ	13	5	38
Trypetidæ	7	1	14
Anthomyidæ	26	4	15
ACALYPTRATA ..	77	20	26
Muscidæ	32	18	56
Sarcophagidæ	2	1	50
Dexiidæ	8	2	25
Tachinidæ	20	..	..
CALYPTRATA ..	62	23	37
THE ORDER ..	281	80	28

2. NOTES ON THE TABANIDÆ IN THE COLLECTION OF THE FOREST ZOOLOGIST.

I have recently received for study from Mr. C. F. C. Beeson, Forest Zoologist, a collection of about ninety specimens in this family, collected by Dr. Cameron, Mr. S. N. Chatterjee and himself, mainly in the Western Himalaya and Burma, but including a few specimens from other localities. Both the Western Himalaya and Burma are notorious for Surra, and in view of the importance of an accurate knowledge of the distribution of species in this family for correlation with the distribution of the disease, the etiology of which is, as regards the transmitting agent, still obscure, the collection is of great value. Practically nothing is known of the Tabanidæ of Upper Burma, where the disease is so rife that, according to Captain Enriquez, the trade route to Yunnan is closed for several months of the year, through the Chinese muleteers refusing to expose their animals to its ravages, while the remoteness and difficulty of access of the locality is such that material is almost impossible to come by in the ordinary course. Hence the thanks of the Agricultural Department are due to Mr. Beeson and his Staff, whose tours take them into localities seldom visited by officers of the Agricultural Service,

for material which otherwise there would be considerable difficulty in obtaining.

The material forming the collection has been returned to the Forest Zoologist's collection at Dehra Dun. The various new species discovered are described in another part of this Memoir.

Tabanus excelsus. (Ric.) Ten females from Muthrwala, Dehra Dun, on 30th and 31st October 1919, and one female from Masuri on 18th June 1920. This species was described from 'a long series in bad condition.' In the present specimens the following points at variance with the description are to be noted:—the tarsi are darker than the tibiæ, which may be almost whitish, not yellow; the median triangular abdominal spots are almost linear. In many specimens the two calli are joined by an obvious line, often nearly as broad as the upper callus, making rubbed specimens very misleading. This is probably figure 13 of Plate IV of Leese's paper on Tabanidæ taken at Mohand. Previously only recorded from Mashobra, Simla District.

Tabanus leucocnematus. (Big.) One female from Mohnyin Reserve, Katha, Upper Burma, at light, on 19th May 1919. Previously only known from the Khasia and Lushai Hills in Assam. I have a female in my own collection from Mungpu, Darjiling District, taken on 19th May 1920. Its capture on the same date in two successive years in localities so far apart probably indicate that it is a Spring species, and is really found along the Eastern Himalaya and the Assam Hills to those of the Yunnan Frontier. Miss Ricardo's wording of her key in this group is misleading; the apices of the front tibiæ are black.

Tabanus sexcinctus. (Ric.) This species, previously known from the Lushai Hills and Formosa, is represented by two pairs from Masuri, the dates ranging from 21st May to 29th June 1920.

Tabanus kukhyenensis, sp. nov. Three females from Mohnyin Reserve, 15th to 19th May 1919. A pair from Pyonchaung, North Toungoo, on the 22nd of the corresponding month, and two females from Yanaungmyin, Pyinmana, on 3rd and 9th June 1918, indicate that this also is a pre-Monsoon species.

Tabanus auriflamma. (Wlk.) Two females of this magnificent species from Nambor Reserve, Sibsagar, Assam, on 15th May 1921, a locality from which it has previously been recorded. Extremely pseudaposematic in appearance.

Tabanus sp. nov. From the same locality on the same date, Mr. Beeson sends a new species in Group VI, belonging to the same section as the last, with the first posterior cell open, which I refrain from describing until further material is available, as I am not certain to what extent the specimen before me is rubbed.

Tabanus striatus. (Fb.) A female of this widely distributed species from the Sunderbans, 24th February 1915, and what is probably the male of this species from Dehra Dun on 15th August 1919. The males of *rubidus*, Wd., *albimedius*, Wlk., and *striatus*, Fb. are so similar that separation on ordinary characters is uncertain, and no examination of the genitalia appears to have been made.

Tabanus albimedius. (Wlk.) A male from Masuri, in June 1920. I refer with some doubt to this equally widely distributed species.

Tabanus hirtistriatus. (Ric.) Three females from Mohyin, on 18th May 1919, are probably this Malayan species. They differ from the description as follows:—frons much less narrowed anteriorly, almost parallel; the extension of the callus sometimes reaching the vertex; the palpi practically without black pubescence, and the first two antennal joints with only a trace of such; the front tibiæ are only yellow basally, and, in one specimen, the posterior tibiæ are only black at the apex. The abdomen is more yellow than the description would indicate. The specimens would agree better with the description of the series of males from the Dawnat Range, Tenasserim, doubtfully referred to this species by Miss Ricardo, and possibly two very closely allied species are involved, one of which still lacks a name.

Tabanus sp. near *hirtistriatus.* Two females from Bendaung apparently represent a new species near the above. They are very much larger. With only literature to guide me I refrain from describing them.

Tabanus monotæniatus. (Big.) Six females from Mohnyin, on 18th and 19th May 1919. This record joins up the two previously recorded localities of the North Khasia and Yunnan. Two specimens are of the blackish, and the others of the reddish, brown-abdomened variety.

Tabanus brunnipennis. (Ric.) Three females, from Mohnyin, on 19th May 1919. This is a very distinct species, and its extraordinary recorded distribution, North Kanara, North Bihar and Bangkok would indicate, with the present record, that it is a Malayan species, and on the Western Ghats represents the Malayan element visible in South India and Ceylon.

Tabanus auristriatus. (Ric.) Two females from Mohnyin, on 19th to 21th May 1919, I refer, with a doubt, to this species. One specimen has the antennal teeth prominent and only the apical ring of the third joint black. The frons is slightly narrowed. Previously only known from North Kanara.

Tabanus jucundus. (Wlk.) A female from Masuri, in July 1920. The extension of the callus is clavate at the tip. Previously recorded from this locality.

Tabanus rubicundus. (Macq.) Two females from Petsut, Katha, on 15th and 21st June 1921. Recorded previously from Assam and Java. I am

not sure whether there are not two species mixed up under this name. Comparing these specimens with one from Ceylon in my own collection, these have the antennal teeth much more pronounced and a very long appendix at fork of the third vein. If the relationship of appendix and strong teeth proves constant over a series, the type of Bigot's *monilifer*, sunk here by Miss Ricardo, should be examined for the latter character, and, if present, the name resurrected for such specimens.

Tabanus fuscomaculatus. (Ric.) Five females, from Masuri on various dates in June 1920, and a very large female from Kumaon, June 1914. Previously recorded from Myitkyina and Sikkim, the range of this species is thus extended far to the westward. These specimens present the following differences from the description :—antennæ red, only the apical ring of the third joint black ; the last four abdominal segments black and all finely pale margined, (Miss Ricardo states that the species has the antennæ black all over the third joint, whilst her subspecies, *altermaculatus*, from Manipur, has the antennæ all red) ; the tips of femora and tibiæ are yellow, but the tarsi are distinctly black except for the reddish under fringe. The black spot on the third segment may be lost in a general darkening of that segment. The species is probably variable and *altermaculatus* is possibly not a valid subspecies but only an extreme variation.

Tabanus oxyceratus. (Big.) From Masuri, a male on 17th May 1920, and two females in June of the same year. Previously recorded from this locality.

Tabanus sp. near *oxyceratus.* A female from Bangar, Chakrata, U. P., at 6,000 feet on 1st May 1921, belongs to a species not included in the Oriental fauna. The antennæ are all black and the abdominal segmental rings yellowish without a trace of spots, the scutellum is not whitish. This locality is far within the Western Himalaya, and has produced other Palæarctic species, such as *Chorisops tibialis*, Mg. (Stratiomyidæ, a specimen of which is included in the collection before me), and it will be necessary to compare this species with Central Asian ones belonging to the Palæarctic fauna before deciding whether it is new.

Tabanus orientis. (Wlk.) Three females from Mohnyin, on 16th May 1919. Known from Dungagalli to Yunnan, this is the first Burmese record for the species.

Tabanus fuscicauda. (Big.) One female from Okkyi, Shwegu, on 27th May 1919. Previously known from Ceylon, Sumatra and the Andamans. The Burmese agrees with Sumatran specimens in that the black mark on the second abdominal segment is absent.

Hæmatopota striatipennis. (Brun.) A male from Dehra Dun on 17th January 1910. This is the type locality and the species is not known from elsewhere. It is most extraordinary that the female has never been found, and it may be quite unlike the male, as in some African species. Brunetti states that the species falls in Group II, with the base of the front tibiæ whitish, but in the specimen before me the legs are all brown, bringing it into Group I. This mode of grouping, however, does not work with males, for the male of *javana*, Wd., has the legs all yellow in many specimens.

Hæmatopota beesoni sp. nov. One female, 'on wing,' 11th May 1918, two females taken biting elephants 17th May 1918, all at Bondaung.

Hæmatopota javana. (Wd.) A male from Dehra Dun, in July 1913; a female from Kaiang Reserve, Pyinmana, 4th May 1919, a female from Bendaung, at light, 12th May 1918; and nine females, biting elephants, at the same place, on 17th May 1918. A widely distributed species, not hitherto recorded from Burma. The species seems not uncommonly to come to light; I have recently received one male and four females thus obtained at Banhar in North Bihar, in July and August 1921, from Mr. H. A. Inglis.

Hæmatopota fuscifrons. (Aust.) Three females, Mohnyin, 15th to 23rd May 1919. One specimen has the mid tibial middle ring absent. Not previously known from Burma. Recorded hitherto from 'India' and 'Bengal.'

Hæmatopota burmanica sp. nov. Two females from Bendaung on 17th May 1918. Biting elephants.

Hæmatopota sp. nov. A small species from the same place as the last, on 11th May 1918, apparently represents a new species in Group VI F, but as it is unique I refrain from describing it.

Chrysops dispar. (Fb.) One female from the Upper Dihing, Lakimpur District, is an exceptionally large example of this widely distributed species.

Chrysops flavocincta. (Ric.) One female, Mohnyin, 23rd May 1919, A Malayan species recorded in our region from the Khasia, Ceylon and Travancore.

Much less attention has been paid to *Hæmatopota* than to *Tabanus* in regard to Surra transmission, but it is significant that no less than three species of the former genus, and none of the latter, are recorded as biting elephants which are said to suffer from the disease.

3. NEW SPECIES OF DIPTERA FROM THE INDIAN REGION.

CECIDOMYIDÆ.

ASPHONDYLIA OSBECKIÆ, sp. nov. (Plate XV, fig. 1.)

♀. *Head* grey, vertex with long yellowish hairs, Antennæ about as long as the thorax, brown, 2 + 12 jointed. Scapal joints short, sub-globular, flagellum

with first joint the longest, the next seven subequal, though each is very slightly shorter than the preceding one, about three times as long as broad; ninth about one and a half times as long as broad, tenth as long as broad, eleventh half as long as broad, twelfth very flattened ovate, wider than long. Hairs on basal half of each joint yellowish brown, about as long as the joint itself, on apical half much shorter. The two 'filets' on each flagellar joint as illustrated by Kieffer for his *Parasphondylia* on Plate XII, fig. 3 of fascicle 152 of '*Genera Insectorum*,' save that the lower 'filet' is situated at two-thirds instead of half the length of the joint, the connecting bar being correspondingly shortened. Palpi pale yellow, the palpiger minute, globular, first and second joints sub-equal, elongate, apical half as long again.

Thorax: dorsum shining black with the submedian lines thickly golden-brown haired; shoulders, seen from above, pale yellow. Pleuræ blackish, except pro-and ptero-pleura, which are yellowish. Dorsopleural suture with strong hairs in front of wing roots. Scutellum yellow, metanotum dark. Submedian hairs continued across the scutellum.

Abdomen with basal segment pale yellowish, remainder dark brownish with thick, rather paler, hairs. Ovipositor as long as the body, two-jointed, the second joint at right angles to the first, and twice its length, the needle-like terebra as long as both together. Basal joint with fine longitudinal striations, apical with very short erect pile, slightly longer on distal half. The whole ovipositor brownish yellow.

Legs dark brownish black, coxæ and trochanters a little paler. Pulvilli as long as ungues.

Wings greyish, thickly haired. Halteres with basal half of stem yellow apical half and capitellum black.

Long (without ovipositor) 1·25 mm.

Described from a ♀ taken on Osbeckia flowers, Shillong, 5th October 1920.

Type, partially dissected, in my own collection.

A true *Asphondylia*, unless the palpiger be admitted as a joint, in which case it falls into Kieffer's *Parasphondylia*, if this be admitted a valid genus, which I am inclined to doubt.

MYCETOPHILIDÆ.

Sciara brunniventris, sp. nov.

♀. *Head* black, vertex and face with greyish shimmer. Occiput with short black hairs, a fan of stiff bristles over mouthparts. Antennæ blackish, scapal joints shorter and broader than the flagellar, subequal, the tip of the

second white. Flagellar joints subequal, the first about three and a half times as long as wide, all with pale pubescence. Extreme base of first joint paler. Palpi three jointed, the first joint slightly thickened basally, as long as the second, the third nearly as long as both together, with an apical stiff hair stronger than the other soft hairs of the organ. Eyes bare.

Thorax blackish, shining, sides concolorous. Dorsal margins showing white viewed from above owing to minute grey dusting only visible in certain lights. Median and dorso-central rows of black bristles, the median ending in line with the wing roots, the exterior rows reaching the posterior margin, and becoming stronger posteriorly. Lateral margins in front of wing roots and postalar calli with strong bristles, the concolorous scutellum with some short hairs on the disc towards the hind margin as well as around the margin itself, which bears also two apical much longer bristly hairs.

Abdomen uniformly yellowish brown, the posterior margin of the fourth to seventh segments dorsally and laterally (but not ventrally), blackened to an increasing width, so that only the extreme base of the seventh shows paler. Eighth segment and the two-jointed lamellæ of the ovipositor black.

Legs: fore coxæ pale brown, posterior coxæ dark brownish. All femora pale brown, tibiæ slightly and tarsi rather more darkened. Tibial spurs yellow.

Wings pale hyaline grey, veins brownish. Auxiliary vein hardly reaching the origin of the third, which occurs at one quarter the length of the wing; anterior cross-vein and basal section of fourth vein of equal length. First vein ending slightly beyond the fork of the fourth, of which the petiole and branches are equal. Second posterior cell four and a half times as long as broad. Fifth vein forking near base, the branches diverging suddenly at half length; sixth vein stopping half way to wing margin. Halteres dark.

Long 4 mm.

Described from a unique female in good condition, taken at Cherrapunji, Khasia Hills, on 18th October 1920. In my own collection.

Easily separates from the other species in couplet 8 of Brunetti's table of Indian species on the yellow femora.

SCIARA FLETCHERÆ, sp. nov.

♀ *Head* black, vertex and face with soft hairs, the latter also with greyish shimmer in certain lights. Eyes markedly pale pubescent. Antennæ; scapal joints very dark brownish, the second shorter than the first, flattened spheroidal; scape slightly paler brown with pale pubescence, first thirteen joints subequal, the basal three times as long as wide, apical joint half as long again as the penultimate. Palpi black, three-jointed, the basal joint incrassate, acuminate,

the second thin, the third slightly broader than the second, with the tip elongate mammiliform; all joints subequal. Proboscis black.

Thorax: dorsum and pleura black, somewhat shining, humeri and propleura yellow-brown, the dorsum with only scattered black pubescence, stronger hairs laterally in front of wing roots and on postalar calli. Scutellum concolorous with several transverse depressions, and an apical fringe of soft black hairs.

Abdomen: dorsum and venter black; laterally a broad, uninterrupted primrose yellow stripe (fading in drying to mustard yellow). Ovipositor with the usual black lamellæ.

Legs: coxæ and trochanters black, fore femora yellowish brown, posterior pairs brownish black, all tibiæ and tarsi concolorous, the tibial spurs yellow.

Wings dark greyish black, veins hardly darker. Auxiliary vein long, extending distad of origin of third vein, which arises at one-third length of wing. First vein ending beyond fork of fourth vein, of which the petiole and branches are subequal, the second posterior cell four and a half times as long as broad. Fifth vein forking near base of wing, the branches sharply diverging at half length, sixth vein rather long but not reaching wing margin. Halteres with yellowish stem and dark capitella.

Long 4·5 mm.

Described from a unique female in good condition, taken in grass land along the river bank, Laitlyngkot, Khasia Hills, on 16th October 1920. In my own collection. The specimen fell to the net of the Imperial Entomologist, and I have much pleasure in dedicating the species to Mrs. Bainbrigge Fletcher, who, like her husband, was good enough to turn over to me all her dipterous captures throughout the tour, thus adding largely to the number of species obtained. The yellow fore femora separate this species at once from the others in couplet 9 of Brunetti's Indian table.

Sciara hirtilineatoides, sp. nov.

♀. *Head* black, face somewhat knobbed. Antennæ black, the first flagellar joint slightly longer than the others, which are subequal, all with minute pale pubescence. Palpi black, first joint rather longer than either of the others, which are subequal.

Thorax black, marked as in *hirtilineata* (Brunetti), with four grey stripes, the three dividing black lines bearing, however, very much shorter and sparcer pale hairs. Shoulders not paler, concolorous. Scutellum absolutely bare of marginal hairs, the dorsal margins of the thorax similar.

Abdomen black, with sparce pale hairs on dorsum, sides and venter pale brown. Female genitalia not elongate.

Legs black, the fore and hind femora show brownish in certain lights. Tibial spurs all black.

Wings black, venation as in *hirtilineata*, but the second posterior cell is quite four times as long as broad. The length of the wings to that of the body is also greater than in Brunetti's species. Halteres blackish.

Long 2·75 mm. Wings 5 mm.

Described from 2 females type in perfect condition, co-type with antennæ broken, both taken at Shillong, on 13th October 1920. In my own collection.

Easily separates from *hirtilineata* on the much darker wings and legs. It is a relatively stouter insect.

Sciara khasiensis, sp. nov.

♂ *Head* black, face grey dusted. Eyes bare. Antennæ, scape dark brown, with first joint broader than the second, truncate, second globose: flagellum with first seven joints shortly pedicillate, remainder sessile, all subequal except the first joint, which is slightly longer than any of the others. Base of first joint pale, remainder, and whole of next five joints black, the remaining joints to the apex greyish brown. The colour difference between the sixth and seventh joints is not extremely marked, but between the base and apex of the flagellum it is quite apparent. Palpi of three very short joints, black.

Thorax: dorsum very dark brown, nearly black, with dorso-central rows of pale, short hairs, and similar, longer rows along side margins. Notopleural suture and postalar calli chestnut brown, pleura concolorous, except sterno-and meta-pleura, dark brown. Scutellum chestnut brown, its base darker, with apical hairs. Metanotum dark brown with paler sides.

Abdomen blackish, with the usual black, two-jointed lamellæ.

Legs: coxæ, trochanters and femora bright brownish yellow, tibiæ paler in ground colour, but with closer set black setulæ, apical spurs reddish-brown, tarsi blackish.

Wings almost clear, veins yellowish brown. Auxiliary vein short, only reaching half way to origin of third vein, which arises at half the length of the first. First vein just passing the fork of the fourth, of which the petiole is slightly longer than the branches, second posterior cell five times as long as broad. Upper branch of fourth vein slightly up-turned at tip. Fifth vein forking near base, its branches sharply diverging at half length. Sixth vein ending half way to wing margin. Halteres with yellow stem and dark capitella.

Long 3·75 mm.

Described from a unique female in good condition taken on grass along river bank, Laitlyngkot, Khasia Hills, on 16th October 1920. In my own collection.

This species separates from *Sc. flavofemorata* in Brunetti's table of Indian species, in couplet 11 by the longer second posterior cell and the paler wings and tibiæ.

CEROPLATUS NOTATICOXA, sp. nov. (Plate XIV, figs. 6, 12.)

♂ ♀. *Head* pale to dark yellow, blackened on vertex, and with a median dark line, broadened below, on face. Palpi very short, closely appressed to face, probably two-jointed, the basal very short, pale, the apical elongate reniform, black. (In the figure of the head the palp is shown pulled away from the face and not in its natural position.) Antennæ brown, the scape in some specimens darker than the flagellum. Eyes pubescent.

Thorax: dorsum ferrugineous brown, with very short erect black pubescence, and with traces of a pair of black lines converging V-like posteriorly. The posterior corners and scutellum darker brown, the latter with similar erect pubescence on the disc and without long bristles marginally. The bristles along the dorso-pleural margin very short, but numerous in front of the wing roots. Shoulders and pleura pale yellowish white, the former very noticeable from above. Posterior margin of hypopleuron blackened. Metanotum yellowish, its median area darker.

Abdomen pale yellow-whitish, thickly covered with black hairs, each segment with an apical black band, which in the male occupies most of the first segment and on the others not more than the apical quarter or fifth. In the ♀ the whole dorsum is more or less blackened, the pale colour only showing faintly towards the bases of the segments, male genitalia with basal joint of claspers large, fleshy, pale, the apical black, densely short haired. Female lamellæ yellow, downward-directed, apparently arising from a common plate which is much narrower than the preceding tergite, and standing well separated from the end of the abdomen.

Legs pale yellowish white, tibiæ slightly and tarsi considerably blackened owing to closely set setulæ. Posterior coxæ with a black spot at one-third their length and just before the tip; the extreme base of all femora blackened, the hind pair rather more broadly. In pale specimens the tip of the posterior tibiæ is also darker.

Wings much shorter than the abdomen in the male about as long in the female. The ground colour is slightly yellowish. A large black patch over

base third and fourth veins, a dark band from costa immediately beyond the upper branch of the third vein, fading away posteriorly, and above the third vein extending into the marginal cell to a varying extent. An apical infuscation, varying in depth and in distinctness of separation from the subapical band. None of the veins beyond the upper branch of the fourth quite reach the margin. Halteres with stem pale yellowish and capitella black.

Long 6–6·5 mm.

Described from eleven males, (including type), taken flying round a decaying stem of *Ficus religiosa* on 11th October 1921, a male taken on window, 22nd December 1919, and a female taken on window, 17th August 1919: all at Suduganga, Matale, Ceylon. Type, allotype and co-types in my own collection.

In describing below two new species of *Platyura*, Brunetti's key to the genus in the "Fauna of India" may be amended to include them. They will both run down to couplet 11, from which point the key will run as follows:—

11. Petiole of fourth vein at least one-third as long as the branches....12
    Petiole of fourth vein much shorter than this.....14
12. Antennæ brownish yellow, all veins distinct.....13
    Antennæ black, veins posteriorly indistinct....*indistincta*, Brun.
13. Thorax bright reddish brown, coxæ and femora yellowish. *ruficornis*, Brun.
    Thorax dull brown, coxæ and femora white.....*juxta*, sp. nov.
14. Head and antennæ mainly blackish, wings unmarked.....*longifurcata*, Brun.
    Head and antennæ mainly yellowish, wings with preapical spot....*lunifrons*. sp. nov.

Couplet 13 of the key will then follow.

Platyura juxta, sp. nov.

♀. *Head* yellowish brown, epistome and palpi darker, ocellar area blackened. Antennæ pale greyish yellow, scapal joints no wider than first flagellar and very short. Occiput thickly black haired: a somewhat prominent small tuft of black hairs above epistomal margin. Eyes minutely pale pubescent.

Thorax yellowish brown, with narrow blackish dorso-central stripes, very indistinct, turned outwards and downwards anteriorly to the black shoulders. Dorsum thickly black haired, the lateral margins and an area between and behind the wing roots with much longer, bristly hairs. Scutellum and metanotum concolorous, the former with about eight strong marginal bristles

and many very short ones arising very slightly below the former. Pleura dull yellowish brown, bare.

Abdomen black, the hind margins of the segments very narrowly dirty yellow. The second segment with the anterior two-thirds of dorsum dirty yellow, and the apical sternite yellow; venter otherwise as dorsum. In specimens with distended abdomen the lateral suture will probably show as a dirty yellow line.

Legs white, tibiæ slightly and tarsi greatly blackened.

Wings smoky yellowish grey, all veins very distinct. There are traces of a dark suffusion below the tip of the third vein. Petiole of fourth vein over one-third the length of the branches. Halteres with stem whitish and capitella darker brownish.

Long 3·75 mm.

Described from a unique female in perfect condition, taken on window, at dusk, Suduganga, Matale, Ceylon, 8th October 1921. In my own collection.

Platyura lunifrons, sp. nov.

♀. *Head* yellow, occiput and face with black hairs: Ocelli within a round, black patch, yellow, prominent. On frons between ocelli and antennæ a raised luniform transverse area; its upper margin convex, with the extremities fitting into rather deep emarginations in the eyes, and the middle of its concave lower margin produced triangularly, with the apex between the roots of the antennæ; this triangular area with short black hairs. There is a depression across the lunule from below the mid ocellus to the base of the produced triangle. Antennæ yellowish grey, second scapal joint slightly darker than the first, which is yellowish white; first flagellar joint twice as long as second, its lower side emarginate basally, the base of the joint being half the width of the apex; apical joint twice as long as penultimate. Palpi yellowish, the two basal joints much broader than the two apical, but together not much longer than the third joint, which itself is little more than half as long as the still narrower fourth joint.

Thorax yellowish to reddish brown, with black hairs, which are numerous and strong along the dorso-pleural margin, increasing in length posteriorly to above the wing roots, where they become definite bristles, behind which, and on posterior margin, they are much sparcer. Scutellum concolorous, with its apical margin well bristled. Pleura yellowish, with some greyish shimmer, metathorax more greyish. The thoracic dorsum may have a pair of subdorsal brown stripes, but these are not always apparent, or well defined.

Abdomen yellowish brown with black hairs. An impressed transverse line to each segment subapically gives the appearance of concolorous apical bands to the segments.

Legs whitish, tibiæ and tarsi darkened, the latter greatly so.

Wings with distinct yellowish tinge, with a dark patch, more or less oblong in shape, just below tip of lower branch of third vein. Petiole of fourth vein about one-fifth as long as its branches. Halteres yellowish grey with darker capitella.

Long 4·5 to 5·5 mm.

Described from two females in good condition, taken, on windows, Suduganga, Matale, Ceylon, on 25th August 1919, and 9th August 1921 (type). Both in my own collection.

MYCOMYIA UNIFASCIPENNIS, sp. nov. (Plate XIV, fig. 1.)

♂. *Head:* vertex and frons pale brown with black hairs. Ocelli in a darkened area, the median one not distinguishable. A furrow runs from below the ocelli to above the antennæ, where the frontal colour is paler yellowish with no black hairs. Face yellowish, somewhat shining, epistome concolorous, not shining, with fine scattered dark pubescence. Antennæ, scape yellow, the joints apically with black bristles; flagellum, basal half yellow, the apical six or seven joints darkened to brownish grey. First flagellar joint twice as long as the second. Eyes very minutely pale pubescent. Palpi yellow, fourth joint as long as first three together.

Thorax: dorsum shining very dark brownish black. Shoulders pale yellowish white. A short yellow transverse line from in front of wing roots for a short distance upwards. The whole dorsum with black hairs and with strong bristles on anterior margin and corners, along the sides and across the hind margin before the root of the pale yellowish-white scutellum, which bears an apical pair of long, divergent bristles. Pleuræ pale yellowish white, except metapleura, which, viewed from side, are dark brown except lower corner, yellowish, viewed from behind, all yellowish. Metanotum dark brown,—sometimes with traces of a median pale line.

Abdomen dark yellow with black hairs. Second, third and fifth segments dorsally black, with narrow yellow anterior and posterior margins, the darkened area of the two latter descending further towards the wholly yellow venter than on the former, on which it is also narrowed below. Sixth segment varying from all black above—(and without any yellow band separating it from the fifth, on which the hinder band is then absent)—to dark yellow with only a lateral, basal, black spot. Genitalia dark yellow, the corners of the dorsal

platet urned downwards, and covered with golden pile, the tips with a row of hairs. External to these the tips of a subulate pair of claspers, also hairy, can be seen. Beneath the dorsal plate project the blunt tips of a pair of palp-like processes, closely approximated, and with their apices turned downwards. On mid line, ventrally, is a long, curved, thin process, its tip upturned nearly to meet the median processes, apically bilobed, with a tuft of short dark brownish stiff hairs.

Legs: coxæ pale whitish, the hind pair with a median row of bristles on the outer face. Femora yellow, the hind pair slightly darkened on the underside basally. Tibiæ and tarsi darkened, but without any yellow colour, the ground colour, below the closely set setulæ, whitish.

Wings: basal half hyaline yellowish. A median black band, darker above the fourth vein, its inner margin running from just before the tip of the auxiliary vein, across the base of the Sciophiline cell—(the inner upper corner of which is just clear)—slightly outward directed from lower end of the anterior cross vein, with irregular margin, to lower branch of fifth vein, which it meets before half its length, then slightly inwardly directed—(the colour is here much fainter)—to the wing margin just below the fork of the fifth vein. The outer margin of the band is nearly straight, running from just before the tip of the first vein to the tip of the upper branch of the fifth vein. Colour of wing external to the band hyaline grey. Veins yellow, except through the band, where they are black. The tip of the sixth vein, which enters the band, being thus well marked. Costa extending a little beyond the tip of the third vein but not reaching the apex. Sciophiline cell nearly square, its outer and lower sides equal. Halteres yellow.

Long 3·5 to 4 mm.

Described from two males both in good condition, except for the loss of one fore and one hind tarsus in the co-type, both taken on window, Suduganga, Matale, Ceylon, on 15th August 1921, at dusk, and on 17th August 1921, in early morning (type). Type and co-type in my own collection.

If *Neoempheria*, Osten-Sacken, is admitted distinct from *Mycomyia*, Rondani, this species will come in it.

Azana asiatica, sp. nov. (Plate XIV, fig. 4.)

♂. *Head* yellow, vertex, frons and face with dark hairs: palpi concolorous, the first three joints very slightly darker, the first two short, the third and fourth subequal and each as long as the first two together. Antennæ, scape yellow, both joints apically long setose above; flagellum pale brownish grey, thickly pale pubescent.

Thorax: dorsum orange yellow, with three slightly darker stripes, not well defined; scutellum concolorous, both with rough erect hairs of the same and slightly darker shades intermixed. Pleura and metanotum paler yellow. Pro- and hypo-pleura with rows of concolorous hairs.

Abdomen: seven-segmented, yellow, with rather thick concolorous pubescence, the third to sixth segments with a median transverse dorsal brown band, interrupted on the mid line. Genitalia large, complex, wider a little than the seventh segment, the side pieces long and large, touched with brown on their apical margins.

Legs: yellow, tarsi very slightly darkened. Extreme tips of coxæ, trochanters and femora touched with black.

Wings: hardly as long as the abdomen, with setulæ distinctly longer than usual, but not to the extent of *Leptomorphus*. Venation in accordance with the generic definition. Halteres yellow.

Long 3 mm.

Described from a unique male in perfect condition, taken on a window, Suduganga, Matale, Ceylon, on 16th September 1921. In my own collection.

Agrees entirely with Johannsen's definition of the genus in *Genera Insectorum*, except for the seven-jointed abdomen, which being so, somewhat exceeds the wing in length; the genitalia are more prominent than his description would indicate.

MANOTA ORIENTALIS, sp. nov. (Plate XIV. figs. 7, 8.)

♂. *Head:* frons black, short; face yellowish grey with golden hairs, stronger below. Antennæ directed upwards and forwards, brownish yellow 2+14 jointed. First scapal joint broad, short; second apically setose, broader, than the first flagellar. Flagellar joints compact, of approximately uniform length, the apical very slightly longer, all pale pubescent. Palpi pale yellow, very prominent; first joint coniform, the second attached to its outer side at about half its length, leaving a triangular flap projecting backwards behind the insertion of the second joint, which is three times as long as the first joint proximal of the point of attachment of the second; third narrow, not as long as second, directed angularly backwards—(generic character)- the whole organ pale pubescent. Eyes pale pubescent.

Thorax yellowish, with paler pubescence on anterior half of dorsum and black pubescence on posterior half, pleuræ concolorous, as is also scutellum, but with stronger dark pubescence and the apical margin definitely dark, with six marginal dark bristles of which the innermost pair are the longest and strongest. Metanotum pale yellow.

Abdomen yellow, the hinder segments darkened, with dark pubescence, segmental margins distinct but unmarked. Genitalia yellow, small, their structure not apparent.

Legs pale yellow, tibiæ and tarsi darkened owing to closely set setulæ. Mid and hind tibiæ with two apical spurs.

Wings greyish hyaline; third vein approximated to first. Costa ending before apex, but nearer upper branch of fourth than third vein. Fourth vein with only tip of upper branch and all lower branch of fourth present, petiole absent; fifth vein complete, sixth not apparent, seventh strong. Halteres dark yellow, capitella brown.

Long 2·5 mm.

Described from a unique male in perfect condition taken on window, Suduganga, Matale, Ceylon, on 1st September 1921. In my own collection.

The species runs more like a *Phlebotomus* than a Mycetophilid.

This species is at variance with Williston's definition of his genus in that the mid tibia has a double, not a single, spur. Although the third palpal joint is in accordance with the generic definition, the latter says nothing in regard to the remarkable prolongation of the first joint, which is therefore presumably absent in the West Indian species for which the genus was founded. The description of Meunier's fossil species is not accessible to me, but as Johannsen sinks the genus erected by Meunier for it in Williston's living genus, I take it that the palpi show no difference therefrom. In Johannsen's figure of the wing, which is after Williston (*Genera Insectorum*, Fasc. 93 Pl. IV, fig. 21), the petiole of the fifth vein is shown incomplete, which is not mentioned in the generic definition. These trifling differences do not justify the erection of a new genus.

KEY TO THE DESCRIBED SPECIES OF INDIAN EXECHIA.

1. Dorsum of thorax yellow to orange 8
   Dorsum of thorax dark borwn to black 8
2. Dorsal margins, viewed from above, paler than central area 3
   Dorsal margins, viewed from above, not paler than central area 7
3. Larger spp. (5 mm.). All yellow, pale margins ill-defined 4
   Smaller spp. (3 mm.). Pale margins well-defined and usually reaching posterior corners 5
4. Abdomen not compressed—antennæ erect .. .. *flava*, sp. nov.
   Abdomen compressed—antennæ porrect .. .. *basilinea*, Brun.
5. Dorsum bright orange, margins brilliant silvery .. .. *argenteofascia*, mihi.—*a.*
   Dorsum with darker stripes, margins whitish 6
6. Abdomen with dorsum all black .. .. .. *mirastoma*, sp. nov.
   Abdomen with dorsum of fourth and seventh segments white .. *albicincta*, sp. nov.
7. Dorsum with paler median V-mark bordered by erect bristles, posterior subdorsal area brownish .. .. .. ***cristata*, mihi.**

	Dorsum all yellowish brown, no definite markings	*zeylanica*, mihi.
8.	Pale lateral margins broader, extending across base of scutellum, central black patch narrowed anteriorly	*ampullata*, mihi.
	Pale lateral margins narrower, not extending across base of scutellum, central dark patch with median markings ..	9
	Pale lateral margins wanting	*paramirastoma*. sp. nov.
9.	♂ antennæ longer than head and thorax	*longicornis*, sp. nov.
	♂ antennæ shorter than head and thorax	*brevicornis*, sp. nov.

EXECHIA ALBICINCTA, sp. nov.

♀. *Head*: black, frons covered with pale silvery hairs. Epistome dark yellow, palpi pale yellow. Eyes with microscopic pale pubescence. Antennæ, scape and first three flagellar joints yellow, remainder brownish with white pubescence.

Thorax: dorsum dull yellowish brown, the sides, viewed from above, obscurely whitish. A pair of subdorsal dark stripes, fading away anteriorly, converging V-like at base of scutellum, their inner edges marked on the anterior third (where they are evanescent), by lines of diverging black bristles. Scutellum yellow, with admedian black stripes continuing the mesonotal bars leaving only the centre and extreme edges yellow. An apical pair of strong, divergent, black bristles. Shoulders and lateral margins of mesonotum with black bristles, a very strong one on each hind corner. Pleura: pteropleuron yellow, meso- sterno- and hypo-pleura black with grey shimmer. Metanotum black with vertical yellow bars descending from lateral corners of scutellum for some distance.

Abdomen: dorsum very dark brownish to black. Base and extreme hind margin of first segment pale; fourth, except for anterior margin broadly, and seventh segments yellowish white. Laterally the abdomen is pale yellowish white on all segments except the sixth, but on second, third and fifth the dorsal black descends to ventral margin on fore and hind edges, the upper margins of the white areas being evenly arched. Venter yellowish white, as are also the small genital lamellæ.

Legs: pale, tibiæ somewhat and tarsi greatly blackened. Tips of hind femora obscurely darkened. A black bristle just beyond base of hind coxæ on the outer side.

Wings: slightly greyish hyaline; third vein running very close to first, and absolutely straight; fifth forked far beyond fourth. Halteres white.

Long 2·75 mm.

Described from a unique female in perfect condition, taken on window, Suduganga, Matale, Ceylon, on 26th September 1921. In my own collection.

EXECHIA BREVICORNIS, sp. nov.

♂. *Head* black, frons with pale pubescence. Lateral ocelli golden, prominent. Some bristles around eye margins, eyes minutely pale pubescent. Antennæ short, not as long as head and thorax; scape and first flagellar joint yellow, remainder greyish brown with pale pubescence.

Thorax dark brown with pale front and lateral margins, bristly at sides and above shoulders, and with a single, strong, postalar bristle. An indistinct V-shaped yellowish brown marking medianly, only visible when viewed from in front. Scutellum dark brown with a pair of long, divergent, apical bristles. Metanotum dark brown; pleuræ brown, propleuron and upper half of pteropleuron yellower.

Abdomen black, laterally compressed. All segments dorsally and laterally very narrowly edged yellow on posterior margins. Genitalia not swollen, yellow. Beyond the side pieces are an elongate pair of narrow rod-like processes, blackish, with two strong black spines at the tip of each, arising from middle of lateral margin; below them are two shorter, narrower processes, also with black hairs, and a pair of ventral processes nearly hidden in strong bristles.

Legs yellow, tibiæ and tarsi darkened, as are also the tips of posterior coxæ.

Wings greyish. Halteres pale yellow.

Long 3·5 mm.

Described from a unique male in good condition, taken in pinewoods, Shillong, on 9th October 1920.

Type in my own collection.

This species is superficially very similar to *E. longicornis*, but the elongate antennæ and very different genitalia will at once serve to separate the males.

The females of both, unfortunately, remain unknown.

EXECHIA LONGICORNIS, sp. nov.

♂. *Head:* frons black, with silvery pubescence, the prominent lateral ocelli yellow. Face yellowish. Eyes very minutely pale pubescent. Some bristles on frons along eye margins, and a median pair, divergent, above root of antennæ. Antennæ considerably elongated, longer than head and thorax, about as long as mid tibia. Scape yellow, both joints with apex above and below with black bristles. Flagellum with basal half of first and extreme base of next two joints yellow, remainder greyish brown, the apical joint half as long again as the penultimate. Palpi yellow.

Thorax dark brown with sparce pale pubescence and black bristles on anterior and lateral margins, above shoulders, and postalar. The brown area is outlined by a pale margin along lateral margins of dorsum, whitish grey above the shoulders and more yellowish behind the wing roots. A medisn pair of ill-defined pale lines, converging V-like to root of scutellum, which is concolorous, with an apical pair of strong, divergent, bristles. Pleuræ brownish grey, propleuron and upper half of ptero-pleuron yellower, the former with several bristles as usual. Metanotum dark with paler lateral margins.

Abdomen strongly laterally compressed, black, with pale pubescence. The hind margins of the first and second segments and the anterior margin of the third, yellow, very narrowly so dorsally. Second and third segments all yellow ventrally. Remaining segments with traces of pale lateral margins. Genitalia, swollen, hairy, dark yellowish, apparently consisting of large yellow side pieces between which can be seen from above a pair of white laminæ, their inner margins only slightly separated, their outer curved strongly, their tips incurved to meet one another, so that the whole appears as a single cordiform plate with a dark median depression not reaching the extreme tip. From the middle of the side pieces, and, more closely approximated, from near their lower margins, extend posteriorly the tips of elongate processes, all with black hairs apically.

Legs yellow, tibiæ and tarsi, also extreme tips of hind femora, darkened.

Wings yellowish grey, halteres pale yellow.

Long 3·25 mm.

Described from a unique male in good condition, taken in deep shade, Shillong, on 15th October 1920.

Type in my own collection.

Exechia flava, sp. nov.

♂. *Head* yellow. Frons with a row of black bristles around eye margins, and above base of antennæ. Face slightly greyish tinged. Eyes minutely pale pubescent, palpi and antennæ yellow, the scapal joints of the latter with black bristles, the flagellar joints very slightly darkened on apical half. Antennæ erect, not porrect as usual.

Thorax all yellow, the median dorsal area slightly browner, the sides above the shoulders, whitish viewed from above. Strong bristles on front and side margins, and in postalar region. Scutellum yellow, crossed subbasally by a dark bar, with a pair of long, crossed, apical bristles, in front of which is a similar, much smaller pair. Metanotum concolorous, with a pair of vertical brown bars admedianly, very narrowly separated. Pleuræ yellow.

Abdomen not laterally compressed, yellowish, with black hairs; the junctions of the second to sixth segments indefinitely darkened, with, on second and third, traces of a dark median line connecting the darkened areas at front and back margins of the segments. Hind margin of sixth segment not darkened, concolorous with genitalia. First segment with a well defined yellowish-white bar on hind margin. Genitalia brighter yellow. A pair of thin processes arising from above and below on each side meet beyond the side pieces, the lower pair, which are innermost, with a long, black, spine-like bristle at their tips. A median ventral plate, above which is a median upward directed thorn-like organ, can be seen from above between the four processes beyond the end of the side pieces.

Legs yellow, tibiae slightly and tarsi greatly darkened. Hind femora basally darkened along upper and lower edges.

Wings very yellowish. Halteres pale yellow.

Long 5 mm.

Described from a unique male in good condition, from Cherrapunji, on 18th October 1920.

Type in my own collection.

This species is very close to *E. basilinea*, Brun., from which it differs by the barely darkened apical part of the flagellum, the uncompressed abdomen, with much less definite markings, and the darkening at the base of the hind femora. The genitalia appear different, as the long spine at the tip of the lower processes is not mentioned in Brunetti's description of his species, though it is very conspicuous. Similarly I have not been able to distinguish the lemon-yellow palp-like appendages in the place of the dorsal plate, to which Brunetti refers. Descriptions of unmounted genitalia, however, are very unsafe things to go by.

Exechia mirastoma, sp. nov. (Plate XV, fig. 11.)

♂. *Head* black, with pale pubescence on frons. Face very narrow, somewhat yellowish mediandy. Eyes minutely pale pubescent. Palpi yellow, apical joint brown. Mouth parts prolonged, apparently consisting of a membranous plate, strengthened with two parellel bars of yellow chitin, and bounded exteriorly by a pair of yellow, elongate, acuminate organs (like *Tabanus* palpi), with their apices crossed. Antennae much shorter than head and thorax, scape and first flagellar joint yellow, remainder greyish brown with pale pubescence.

Thorax dorsum yellow-brown with median paler V-shaped area and whitish lateral margins, only visible when viewed from above. A small dark

area just above wing roots, behind which is a yellow marginal area containing a long postalar bristle. Front and lateral margins bristly, and along each side of central V-mark nearly as far back as the level of the wing roots, but these do not form a dorsal crest, but are directed to lateral, overhanging the steep slope of the thorax on each side. Scutellum dark brown with an apical pair of divergent bristles. Metanotum brown, pleuræ brownish.

Abdomen laterally compressed, black. Hind margin of first segment laterally very narrowly pale, venter of second, third and fourth segments all yellow, but without pale lateral posterior bands above. Genitalia yellow small, beyond the side pieces the almost filiform processes more or less concealed in a tuft of black bristles.

Legs yellow, tibiæ and tarsi darkened.

Wings greyish. Halteres yellow, with black clubs.

Long 2·75 mm.

Described from a unique male in good condition, taken in the pinewoods, Shillong, on 9th October 1920.

Type in my own collection.

It is much to be hoped that further specimens of this species will come to hand, to enable the extraordinary structure of the mouthparts to be properly made out.

Exechia paramirastoma, sp. nov.

♂. *Head* frons yellowish grey, with black hairs; a row of short black bristles above the antennæ, below which the colour is more yellow; face yellow. Palpi short, first joint yellow, remainder brown. Proboscis yellow, apparently similar in structure to *E. mirastoma*, sp. nov. Antennæ with scape and base of first flagellar joint yellow, remainder brownish grey with minute white pubescence. Lower edge of first scapal joint noticeably black bristled. Eyes practically bare, the pubescence extremely minute, pale.

Thorax dorsum very dark brown, the anterior margin narrowly paler owing to a little silvery pile, and the supra-alar region yellowish. There are traces of a median paler V-mark anteriorly, along which are a few irregularly placed black bristles. All the dorsum with short black hairs. The anterior margin bristly, as are also the lateral margins, especially towards the wing roots, and with several strong alar bristles. An acrostichal prescutellar pair, golden brown in colour. Pleura pale whitish, pro-, meso- and meta-pleura brown, the last with a vertical row of three strong bristles. propleuron with two sets of bristles, the upper, smaller set variously directed, the lower three or four in number, declinate. Scutellum black, with a pale margin

viewed from below, with an apical, very strong, erect pair of black bristles, between which there passes a much smaller, subapical, porrect pair. Metanotum yellow, with median black bar nearly as broad as the scutellum.

Abdomen strongly laterally compressed. The first six segments all black on dorsum, except for a narrow pale apical ring to first segment. Venter yellow; laterally the dorsal black extends to venter on hind margins, but basally the yellow of the venter reaches about half way up the sides, making triangular yellow patches, except on first segment which has only the midline of the venter yellow, all the side being black. Seventh segment, except for extreme base, and genitalia brown, the lower edge of the former extending beneath the latter, its concave posterior margin with strong bristles.

Legs: coxæ yellow, femora concolorous, with dark hairs, tibiæ darkened and tarsi blackened. Fore trochanters with an elongate cuneiform black fleck on upper side.

Wings grey, fork of fifth vein practically immediately below the origin of the third vein. Halteres with pale stem and capitella darkened.

Long 3·25 mm.

Described from a unique male, in perfect condition, taken on window, Suduganga, Matale, Ceylon, on 4th November 1921. In my own collection.

Mycetophila khasiensis, sp. nov.

♀. *Head* pale brown with fine black pubescence, rather longer on the frons and vertex than on the face, which is slightly convex. Eyes minutely pale pubescent. Antennæ yellowish brown, the scape slightly paler, the flagellum with minute whitish pubescence. Palpi yellow, fourth joint straight and very little longer than the third.

Thorax brownish yellow with short golden pubescence and black hairs. Anterior and lateral margins, especially in front of wing roots, humeri and postalar region, bristly, a prescutellar dorso-central pair. Scutellum concolorous, with four marginal, parallel, bristles. Metanotum and pleuræ rather paler brownish yellow.

Abdomen yellow-brown, strongly compressed, the dorsum darkened, with pale hind margins narrowly to the segments dorsally and laterally. Ovipositor flattened, ensiform, the lower margin evenly curved to the very slightly erected tip, the upper margin broadened on basal third to a shoulder, whence it is evenly curved to tip. In the notch of the shoulder the slightly darker yellow, black haired lamellæ are situate.

Legs yellow, tibiæ and tarsi somewhat darkened. The inside range of setæ of mid tibiæ much shorter than the two outer ranges, of five bristles, the

lowest much the longest, and all crowded towards the middle of the joint. Inner range of hind tibiæ also much shorter than the two outer ranges, but the differences in size between the individual bristles is not so marked—(though the lowest is again the longest)—and the range extends over the apical three-quarters of the joint.

Wings and halteres yellow.

Long 4·5 mm.

Described from a unique female in good condition, taken on a window, Shillong, on 11th October 1920.

Type in my own collection.

In Brunetti's key to the genus in " Fauna India, Nematocera " this species divides from his *cinctiventris* on the unicolorous thorax.

PSYCHODIDÆ.

Pericoma metatarsalis (Brun.) var. *khasiensis* (nov. var.) (Plate XV, figs. 2, 3, 4.)

♂ ♀. *Head* black, covered with white scale-like hairs, a fan of which overhangs the mouth parts, which appear to be formed for biting. Antennæ pale brown with white hairs, 2+14 jointed, the scapal joints wider than the flagellar, the first short, the second globose ; flagellar joints, the first shorter than the next ten, the next two about as long as the first, the apical rather longer than any other. Palpi five jointed, the first three joints stout and long, the two apical thinner and shorter, subequal.

Thorax black, thickly clothed with erect white scales, those on the posterior half of the dorsum of a dirty white, with their tips darkened. A very strong tuft arises from the postalar calli. Scutellum similarly clothed.

Abdomen black, with erect white thread-like scales. Male genitalia dark brown, more or less concealed amid white hairs in unrubbed specimens, the lamellæ at the tip of the inferior claspers brownish yellow. Female ovipositor yellow-brown, laterally compressed, slightly down-curved, prominent.

Legs dark brownish (the female femora paler yellowish brown) with scattered white hair-like scales on femora and tibiæ, the latter with their tips ringed by flat white scales. All metatarsi with rather more than the apical half white, the remainder of the tarsi very black. Along the inner side of the metatarsi is a narrow black area running through the white, so that, viewed from certain positions, the metatarsi appear all black. Hind tibiæ with so many white hairs as to appear quite white on basal three-quarters, with some outstanding long white hairs above, a row of stiff dark hairs below towards the middle, and a tuft of such all round the tip.

Wings with divaricate rows of brown hairs along the veins, only slightly overlapping one another. From second to seventh a black spot at the tip of each vein formed of closely approximated hairs. There are erect hair-like scales in tufts as follows :— on petiole of upper branch of second vein (white), at fork of upper branch of second (thick, black), which continues, less densely (black) along each branch, and on the lower branch of the vein immediately below, as far as a point almost below the tip of the first vein, at which point the black gives place to small white spots; at fork of fourth vein (black), on middle of upper branch of fourth (white), at one-third and two-thirds length of fifth (white), and at two-thirds of seventh (white). Base of wing covered with upstanding grey scales among which are some white ones. Wing fringe black, very dense on costa, and long on hind margin; the outer half shows white between tips of lower branch of second and third veins at extreme apex. Halteres black.

Long 1·5 mm.

Described from four males and two females taken on leaves of scrub-forming hedges, Mawphlang, Khasia Hills, on 10th October 1920. Type, allo-type and other specimens (one dissected and mounted), in my own collection.

Except the types, none of the specimens are in good condition. The day was wet, cold and dull, and they have suffered in a damp net.

I hesitate to make a new species of these specimens, as they accord well with Brunetti's description, save that he states that the fringe of the wing at the tip is composed wholly of white hairs, whereas in my specimens the fringe is black at the base throughout, and only the outer half of the hairs are white.

Further, the white section is much shorter than Brunetti describes. The description of *metatarsalis* is a differential one,—so I have described my variety at length,—as it may prove a good species, when males of *metatarsalis* come to hand, and it becomes possible to examine the male genitalia.

Simuliidæ.

On the Indian species of the genus Simulium, Latreille.

Since 1911, when Brunetti described seven species, all from the Himalaya and Assam Hills, with two of the species extending to the Western Ghats in North Kanara, nothing further has been done in the study of the Indian forms. The same author, in the following year, added a very distinct species from Ceylon, the distribution of which was later extended to the Palni Hills of the extreme South of the Peninsula by Patton and Cragg, who included it in their table of Indian species. Brunetti having described it too late for inclusion

in his table in the 'Fauna of India.' Although Patton and Cragg appear to have bred the species they say nothing about the male which, if I am right, is very different to the female. Five out of seven of Brunetti's species are described from examples of one sex only, and regarding two of them, he considers that they possibly represent alternative sexes of a single species. As other species, when their alternative sex is discovered, may also show sexual differences, in the table now offered I have indicated the sex of the species indicated. The male of *striatum*, described herewith, I take to be that species, as I have found it in company with undoubted females though not actually *in cop.*, which alone can settle the matter. *S. striatum* is the only species hitherto recorded from Ceylon, although I take this opportunity of recording the capture of a male *grisescens*, hitherto only known from a unique male from Kurseong, on a window at Suduganga, Matale District, on 13th January 1920, which affords yet another instance of that close relationship which exists between the dipterous fauna of the Island and the Eastern Himalaya.

Except for Patton and Cragg's record, the *Simuliidæ* of the Madras Presidency have remained quite unknown, but three species are now described. I have not seen examples of *striatum* from the Palnis, and such may form an annectent link between *striatum* of Ceylon and *latistriatum* from the Nilgiris, which, although their descriptions read much alike, appear perfectly distinct when the two species are placed side by side.

KEY TO THE INDIAN SPECIES OF *SIMULIUM*.

(Based on Brunetti's key in 'Fauna of India.')

1. Thorax unstriped .. .. 2.
   Thorax striped .. .. 12.
2. Thorax black, at most with dull reddish brown tinge .. 3.
   Thorax distinctly reddish brown, with short yellow hair .. *rufithorax*, Brun. ♂ ♀
3. Thorax with grey shoulder spots and a wide greyish band on posterior margin .. .. *grisescens*, Brun. ♂
   Thorax without definite shoulder spots ,and with no posterior band .. .. 4.
4. Abdomen destitute of any signs of yellow hair .. .. 5.
   Abdomen with short bright yellow hair, or with rather long brownish yellow shaggy hair .. .. .. 10.
5. Hind metatarsus much incrassated, nearly as long and as large as its tibia .. .. *metatarsale*, Brun. ♂
   Hind metatarsus not so conspicuously incrassated, distinctly less in size than its tibia .. .. 6.
6. Antennæ wholly black. Length 2·5 mm. .. .. *griseifrons*, Brun. ♀
   Antennæ reddish yellow at base. Smaller species .. 7.

7.	Femora black	8.	
	Femora yellow or pale brown	9.	
8.	Fore tibiæ whitish yellow	*rufibasis*, Brun.	♀
	Fore tibiæ black	*pattoni*, sp. nov.	♀
9.	Mid femora dark	*striatum*, Brun.	♂
	Mid femora yellow	*gurneyæ*. sp. nov.	♀
10.	Abdomen with normal, short, very bright yellow hair ..	11.	
	Abdomen with distinctly longer, shaggy, brownish yellow hair .	*senile*, Brun.	♂
11.	Abdomen with at least the first two segments distinctly yellowish or brownish yellow; often several segments so coloured	*indicum*, Becher.	♂ ♀
	Abdomen all black	*aureohirtum*, Brun.	♂ ♀
12.	Admedian grey stripes much wider than the acrostichal black stripes	*striatum*, Brun.	♀
	Admedian grey stripes hardly as wide as the acrosctichal black stripes	*latistriatum*, sp. nov.	♀

Simulium striatum, Brunetti.

♂. *Head* black, face with pale brassy pubescence. Antennæ stout, reddish-brown, with pale pubescence, appearing almost yellow in some lights, in others darker, but never black, and always unicolorous from base to tip. Proboscis and palpi brown, a little darker than the antennæ, the basal joint of the palpi not incrassate.

Thorax black, the dorsum covered with bright brassy golden hairs, usually more or less denuded on middle third, with no traces of the female stripes. Pleuræ dark grey, with ashy grey reflections, and sometimes a tinge of brown on humeri and sternopleura. Scutellum black, with brassy golden hairs and some apical black bristly ones. Metanotum black, with minute brassy pile.

Abdomen black, with some microscopic pale hairs on dorsum, but no golden ones, the basal hair fans brown. Genitalia concealed.

Legs: fore coxæ yellow, with pale hairs, trochanters darker, also with pale hairs, femora and tibiæ pale brown, tarsi blackish. Posterior coxæ dark (except apex of mid pair, pale), trochanters pale. Mid femora dark except extreme tip tibiæ dark brown with pale base, tarsi blackish. Hind femora brown, tibia incrassate, as large as femur, with base pale, otherwise concolorous. Metatarsi with basal half pale and apical dark, second joint pale at base, remainder black, third and fifth joints black, fourth pale with a black line across the middle. Hind metatarsus as long as tibia—but half its width.

Wings normal, with veins yellow. Halteres golden brown.

Long 1·5 to 2 mm.

Described from 8 males all in good condition, taken on windows, Sudugangа, Matale, Ceylon, as follows:—three on 28th December 1919, in company with 3 females; on 18th, 22nd, and 23rd January 1920; and 20th March 1920. All in my own collection.

SIMULIUM LATISTRIATUM, sp. nov.

♀ *Head* dark grey, face more ashy grey. Frons triangular. Antennæ with scape yellowish, flagellum very dark brown, with pale pubescence. Palp black, basal joint hardly thickened. Proboscis brown.

Thorax ash grey, with pale silvery hairs. Five black stripes, broader than in *S. striatum*, median, acrostichal, and subdorsal, the outer pair on each side joined along the fore margin, and thus the grey ground colour only reaching the fore margin each side of the median stripe, which hardly reaches the margin. All stripes stopping just before the level of the wing roots, and the acrostichal pair slightly convergent anteriorly. The posterior quarter of the dorsum is all black viewed from a low angle in front, and all grey from an equal angle behind. Pleuræ dark brownish grey, scutellum concolorous, hind margin on underside a little brownish. Metanotum dull black. Scutellum denuded, probably in life with the pale pubescence of the thoracic dorsum.

Abdomen black, the latera lbasal hair fans pale.

Legs: fore coxæ yellow, posterior pairs blackish; all trochanters and femora yellow; all tibiæ yellow with black tips. Fore tarsi all black, the first three joints enlarged. Mid metatarsus and second joint whitish with black tips, third and fourth joints more or less brown, fifth black. Hind metatarsus two-thirds as long as tibia, and half its width, whitish with black tip, second joint similar, in colour third to fifth brownish.

Wings normal, veins very pale yellow-white. Halteres bright yellow.

Long 1·25 mm.

Described from two females in good condition, biting bull, Coonoor, 25th September 1920, at dusk. Type and co-type in my own collection.

SIMULIUM PATTONI sp. nov.

♀. *Head* black, frons and face ash grey with silvery hairs. Occipital margins laterally with pale hairs. Antennæ, scape and first flagellar joint yellow, remainder dark brown. Palpi black, basal joint thickened, but not as long as the second. Proboscis reddish brown.

Thorax: dorsum and scutellum black, covered with bright golden hairs, the latter with black marginal hairs also. Pleura dark grey with ashy reflections; propleuron with a tuft of white hairs.

Abdomen black, with scattered very short pale hairs; lateral basal hair fans pale.

Legs fore coxæ yellow-brown, posterior pairs black. All trochanters and femora black. Fore tibiæ and tarsi black, the former with some short golden hairs on the sides, the latter with the first three joints enlarged. Posterior tibiæ black with whitish bases. Mid tarsi very dark brownish, basal half of metatarsus pale, fourth joint obcordate, the two lobes pale. Hind tarsus with basal half or two-thirds of meta,—extreme base of second and lobes of the obcordate fourth joint, pale, remainder black.

Wings normal, veins pale yellow. Halteres bright yellow.

Long 1·5 to 2 mm.

Described from five specimens, all taken on bull at dusk, Coonoor, on 25th September 1920. Type and others, some in indifferent condition, in my own collection. I have much pleasure in dedicating this species to Major W. S. Patton, I.M.S., at that time Director of the Pasteur Institute of Southern India, in grateful acknowledgment of many pleasant hours spent in his laboratories.

Simulium gurneyæ, sp. nov.

♀. *Head* dark grey, face shining whitish grey. Antennæ with scape and two basal flagellar joints yellowish brown, remainder blackish brown. Palpi black basal joint long, thickened. Proboscis black with brown labella.

Thorax dorsum black with indefinite ashy reflections above the fore corners, and rather sparce brassy hairs, scutellum concolorous, with long black hairs on hind margin. Pleura ash grey.

Abdomen black, dorsum with scattered pale pubescence, lateral basal hair fans pale golden. Base of venter yellow or brownish.

Legs: fore coxæ yellow, posterior pairs dark. All trochanters and femora yellow, tibiæ yellow with black tips. Fore femora almost white in certain lights. Fore tarsi all black, the first three joints greatly enlarged. Mid metatarsus yellow with apex darkened, second joint with extreme base pale, remainder and third and fourth joints dark brown, fifth black. Fourth joint obcordate. Hind metatarsus as long as tibia, and a little more than half its width, pale, with black tip, second joint with basal half pale, remainder, and third or fifth joints, black.

Wings normal, veins pale yellow. Halteres bright yellow.

Long 2 to 2·5 mm.

Described from fourteen specimens, some in good, some in indifferent condition, taken on bull at dusk, Coonoor, 25th September 1920. Type, and other specimens in my own collection.

I have much pleasure in dedicating this species to Mrs. W. S. Patton, well known, in collaboration with her husband, in the study of Indian blood sucking Diptera.

TIPULIDÆ

Dicranomyia nitidithorax, sp. nov.

♀ *Head:* occiput and vertex brownish black, frons black with silvery pubescence, a full third of the width of the head, not narrowed below, very long, so that the antennæ practically touch the base of the blackish proboscis with which the palpi are concolorous. Antennæ, first scapal joint yellow, second globose, wider than the first, black; flagellum black, joints well defined, the acuminate apical twice as long as the penultimate, elongate flask-shaped, the whole antenna clearly fourteen jointed.

Thorax: dorsum deep shining very dark brownish black, unmarked, rather highly arched, with presutural dorso-central rows of hairs. Humeri pale yellowish. Scutellum and metanotum concolorous with mesonotum and equally shining. Pleura concolorous, with shimmery white pubescence only visible in certain lights.

Abdomen somewhat shining. Under a low power it appears brown, the apices of the segments yellow banded; under a high power the first six segments show yellow, semi-transparent, the dark organs showing through, the brown coloration not being visible; seventh segment dark brown, eighth black with median transverse grey band. Ovipositor dark brown with short yellow valves. Venter, first seven segments brownish yellow, the segmental junctions, very narrowly darkened, eighth segment blackish.

Legs: coxæ and trochanters and bases of femora yellow, the latter gradually darkening to brown, tibiæ brown, tarsi blackened. (Hind legs missing beyond trochanters.)

Wings uniformly grey, iridescent, stigma distinct but its margins ill defined. Tip of auxiliary vein exactly in line with base of prefurca, the fork of which is just before the tip of the first vein, being thus much shorter than the second vein itself. Basal section of third vein four times as long as the anterior cross vein, which is situate at the upper basal angle of the discal cell, which itself is nearly as long as the second or third posterior cells. Submarginal cell considerably longer than the first posterior. Posterior cross-vein

slightly proximad of the base of the discal cell. Halteres yellow with capitella black.

Long 35 mm.

Described from a unique female in fair condition (legs damaged), taken at Shillong, on 14th October 1920. In my own collection.

The very wide frons and general facies show that this species is allied to Brunetti's *nigrithorax*, but against its being the female of that species are the yellow first scapal joint, shorter prefurca, normal number of antennal joints, absence of gold dusting on thorax, and yellow coxæ.

Libnotes. (*Westwood.*)

In his key to the Indian species of this genus in the '*Fauna*' Brunetti omitted two Indian species, as he notes in his '*Catalogue of Oriental Nemocera.*' In adding two new species from Ceylon, I herewith offer an amended table of the Indian forms.

1.	Wings unmarked,—(except for stigma, present or absent) ..	2.
	Wings more or less conspicuously patterned	3.
2.	Body bright orange red	*thwaitesiana*, Westw.
	Body yellow-brown, abdomen banded	*immaculipennis*, sp. nov.
3.	A cross-vein in submarginal cell	*fuscinervis*, Brun.
	No cross-vein in submarginal cell	4.
4.	Marginal cross-vein nearly twice its own length before tip of first vein	*poeciloptera*, O. S.
	Marginal cross-vein at most its own length distant from tip of first vein	5.
5.	Surface of wing with large spots crossing from vein to vein ..	*notatinervis*, Brun.
	Surface of wing with practically only the veins patterned ..	6.
6.	Scape, proboscis and palpi yellow	*distincta*, sp. nov.
	Scape, proboscis and palpi blackish	7.
7.	Second and third veins absolutely unmarked beyond base ..	*notata*, v. d. Wulp.
	Second and third veins narrowly spotted along their courses ..	*punctipennis*, Meij.

Libnotes immaculipennis, sp. nov.

♂ ♀. *Head* grey, occiput with longish black hairs; frons very narrow, whitish. Antennæ, scape pale brown, with apices of both joints (the first broadly), yellow; flagellum darker brown, basal joints nearly twice as long as broad, the apical narrow, elongate the last not much longer than the penultimate. Hairs of flagellum not much longer than the individual joints. Proboscis and palpi brown.

Thorax yellow: a brownish stripe occupying the whole dorsal surface of the neck and running to suture—(in female more reddish brown posteriorly)—

postsutural calli with large brown spots, median area and scutellum pale yellowish. Dorso-central rows of black hairs on both portions of mesonotum. Metanotum brownish yellow. Pleura yellow, unmarked.

Abdomen brown, apices of segments yellow banded, more distinctly so in female. Venter yellowish. Male genitalia yellow, claspers blunt, black tipped. Ovipositor reddish yellow.

Legs : coxæ, trochanters and tips of femora yellow, remainder of femora tibiæ first two tarsal joints wholly, and basal half of third, brownish yellow tip of third and last two tarsal joints blackish.

Wings, except for a fairly well defined brownish stigma, clear, absolutely without markings on veins or membrane : not as elongate as in the remainder of the Indian species. First vein ending free, joined to costa by an indistinct branch at right angles, *proximad* its own length of the subcostal cross-vein, the true vein, which is marked by the line of short hairs on it, continuing to margin of stigma. Posterior cross-vein beyond middle of discal cell. Halteres yellow, capitella blackened.

Long 5 mm.

Described from a pair, the female taken on 15th December 1918, the male on 19th November 1919, both at Suduganga, Matale, Ceylon. In my own collection.

LIBNOTES DISTINCTA, sp. nov. (Plate XIV, fig. 3.)

♂. *Head* yellow, frons almost pinched out above, triangular below ; face greyish-yellow. Proboscis whitish yellow, palpi deeper yellow. Antennæ, scape yellow, flagellum very pale grey brown, the basal joints nearly as broad as long, the apical joint twice as long as the penultimate, the hairs on the joints slightly longer than the joints themselves. Vertex elevated above eye margins, occiput with long yellow hairs.

Thorax yellow, mesonotum with front and side margins slightly brownish. From fore margin a concolorous stripe, which at one-third of the distance to the suture separates into two admedian stripes, which do not quite reach the suture. At half the distance from fore margin to suture commence a pair of subdorsal concolorous stripes, slightly darkened posteriorly, which cross the suture and become indefinite spots on postsutural calli, the middle depression pale whitish-yellow, scutellum concolorous. Pleura pale whitish yellow, notopleural suture darkened below the dorso-marginal brown band, a dark brown stripe starting on neck, passing above base of front coxæ to middle of pteropleuron, on front half of which it is ill defined. An interrupted brown stripe across middle of front coxa, sternopleuron, bases of posterior coxæ to a

spot on hypopleuron. A brown spot at middle of front side of mid coxa. Metanotum yellow, brownish at sides, with a small black spot below the corners of the scutellum.

Abdomen yellow with dark brown lateral stripes. Genitalia yellow.

Legs yellow, femora with a brown subapical ring, tips of tibiæ and first three tarsal joints slightly infuscated, last two tarsal joints blackened. Ungues with a strong tooth some distance beyond base.

Wings with numerous short black lengths on the otherwise pale yellow veins, around which are often almost imperceptibly faint infuscations. Marginal cross-vein nearly its own length before tip of first vein. Halteres stem yellow, capitella brown.

Long 6 mm.

Described from a unique male in good condition, taken at light, Suduganga, Matale, Ceylon, on 27th November 1919. In my own collection.

RHIPIDIA ZEYLANICA, sp. nov. (Plate XIII, figs. 2, 5.)

♂. *Head:* frons varying in width from that of the two conjoined narrow parafrontalia to one-third that of head, grey. Face concolorous, proboscis and palpi dark grey-brown. Second joint of palpi swollen, more than twice as wide as first joint. First and second joints subequal in length, third and fourth half as long again, subequal, and narrower than first joint. All joints hairy. Antennæ pale brown, first scapal joint twice as long as wide, wider at three-quarters its length than at tip, second vasiform; flagellum, first joint oblate spheroidal, second to ninth cylindrical (except fourth, rather more flask-shaped), tenth and eleventh irregularly rounded, twelfth round with elongate mammiliform apex. The third to eighth joints bear each a pair of finger-like darker brown processes, the second and ninth a single process, less well-formed than on the intervening joints, whilst the tenth and eleventh appear to have rudimentary processes. The processes are pale pubescent, and are longer and rather wider than the joints themselves on third to eighth joints. Occiput grey, with impressed median line and pale hairs.

Thorax brown, with minute pale golden pubescence, the absence of which from certain areas forms darker stripes thus:—a broad median stripe from suture, divided at rather more than half the distance to the anterior margin into three parallel lines, and submedian narrower stripes commencing at the forking point of the median stripe (where they are incurved towards it), and continued across the suture to postalar calli. The forking of the median stripe may not occur, it may continue broad to anterior margin, or the outer lines may disappear at half their length and appear again as spots on the

anterior margin. Pleurae brown with pale golden pubescence, and a dark, almost black, band along sternopleural suture. Scutellum and metanotum concolorous with dorsum of thorax, the former with median darker stripe, and sometimes traces of the submedian thoracic stripes exterior to this.

Abdomen brown, with pale hairs, darkened to black at the junctions of the segments, and with a black lateral line. Genitalia bright yellowish-brown, apparently consisting of two large, subequal, fleshy joints, from inner basal sides of second of which arise a pair of re-curved brown hooks, bearing each on their upper sides at half their length an upward and backward directed spine, apically bifid. Below the large claspers is an unpaired stout median thorn-like process, its tip slightly down-curved.

Legs dull yellow, the femora subapically, the tibiæ and tarsi apically and very narrowly, very slightly darkened,—not always apparent.—(absent in type)

Wings grey, with very numerous slightly darker spots, noticeably on midcosta, over tip of auxiliary and first veins, at base of prefurca and third veins, and over the cross-veins. Veins yellow, the costal black at tip of auxiliary, first and second, the first above base of fourth, through the midcostal spot and at base of prefurca, the fifth, sixth and seventh with several small black lengths. Seventh veins somewhat sinuate. Halteres yellow.

Length: body 4 to 6 mm., wing 6 mm.

Described from four males, two in fair and two in bad condition, three taken at Emelina Estate, Maskeliya District, Ceylon (4,200 feet), on 12th, 13th January 1919, and one at Maskeliya Town, on 26th January 1919 (*G. D. Austin*). Type and other specimens in my own collection.

This species differs from Brunetti's *R. antennatus* (from Simla), by the dichoptic head and the different structure of the antennæ, the development of the flagellar processes extending to all joints in his species.

In the figure of the antennæ on Plate XIII the first flagellar joint is shown somewhat too small. It should be nearly as broad as the second scapal, and nearly half its length.

ERIOPTERA INCOMPLETA, sp. nov. (Plate XIV, fig. 11.)

♂. *Head* yellow grey, frons broad, one-third width of head, occiput with black hairs. Face concolorous, proboscis and palpi brownish. Antennæ; scape brown, the first joint somewhat grey dusted, about three times as long as broad, the second cupuliform, much broader than the first; flagellum, first joint yellow with the extreme tip brown, remainder brown, the first four or five joints rounded, closely sessile, gradually lessening in diameter, so that this part of the flagellum appears under a low power elongate conical, remaining

joints elongate, thin,—all joints from fourth onwards with verticals of a few hairs, the longest of which exceed the length of the first scapal joint.

Thorax grey, presutural dorsum with the usual four stripes, the outer pair not commencing until half length, in front of which there is on each side a small pit-like depression, appearing very dark. Humeri narrowly brownish. Post-sutural dorsum with the usual two dark spots, confluent medianly, the sides above wing roots pale grey, as are also scutellum and metanotum. Pleura brownish with grey dusting.

Abdomen reddish brown, basal and apical joints darker. Bases of third and subsequent segments narrowly yellow banded. Venter similar. Genitalia brown, paler than the last abdominal segment.

Legs : coxæ brown with grey dusting, remainder yellowish brown.

Wings smoky yellow brown, with a large dark fuscous spot around marginal cross-vein with a narrow costal band, nearly as dark, in the first submarginal cell. Subcostal cross-vein apparently at tip of auxiliary, marginal cross-vein near tip of first vein, ending below at bifurcation of second vein, or just on extreme base of its upper branch, which gradually fades out, not clearly reaching the costa. Posterior cross-vein just beyond the fork of the fourth vein. Fifth, sixth and seventh veins not approximated. Costa with longish hairs, those on veins not at all conspicuous. Halteres yellow ; capitella brown.

Long 4 mm. Wing 6 mm.

Described from a unique male in good condition, taken on *Lantana* scrub along river bank, Suduganga, Matale, Ceylon, on 5th July 1920. In my own collection. In Brunetti's table of Indian species this runs to couplet 2 and separates there on position of posterior cross-vein.

Acyphona indica, sp. nov. (Plate XV, fig. 7.)

♂ *Head* yellowish grey, frons narrow, with a median dark stripe. Face whitish grey. Antennæ yellow, apical half darkened, the whole flagellum with thick white pubescence. Palpi black. The antennæ if bent back would reach the wing roots.

Thorax reddish brown ; pronotum, anterior margin of mesonotum (except a narrow median stripe), and a short line extending forwards at the side of the dorsum from the suture, yellowish grey. A pair of admedian nearly black stripes, not reaching anterior margin and stopping at the suture, with the dorso-central rows of paler hairs exterior to them, these rows not separating postsuturally, where they are sparcer. Median area of postnotum slightly paler than the dark sides. Postalar calli yellowish. Scutellum very dark brown, metanotum concolorous in middle, sides yellowish. Pleura brownish,

propleuron more yellowish, mostly grey dusted. Pteropleuron with a fan of longish, soft golden hairs below wing roots.

Abdomen blackish, covered with pale yellowish long hairs. Genitalia brown not prominent.

Legs : coxæ and posterior trochanters greyish brown, remainder yellow, with concolorous hairs. Femora with broad subapical dark rings, tips of tarsi darkened.

Wings clear, veins yellow with numerous short black lengths, especially through the pale fuscous spots that are scattered over the wing along their courses. A darker band over the cross-veins. Hairs on veins not very dense, black. Venation typical, fourth posterior cell in one wing with an adventitious, incomplete, additional cross vein. Halteres yellow.

Length : body 5 mm. : wing 6·5 mm .

Described from a unique male in fair condition, taken in bungalow, Shillong, on 6th October 1920. In my own collection.

This is the first species of the genus to be described from the Indian subregion, the other two Oriental species being Malayan, from Java and Sumatra respectively.

GONOMYIA CONJUGENS, sp. nov. (Plate XV, fig. 8.)

♂ ♀. *Head* yellow, frons with a median dark area ; face, proboscis and palpi very dark brownish black. Antennæ, scape and first flagellar joint yellow, basal half of flagellum otherwise, brown, apical half yellowish. In male fourth to sixth flagellar joints with long, apical hairs, two or three to a joint each as long as about half the whole flagellum.

Thorax dark brown, notopleural suture and humeri whitish yellow, postsutural mesonotal depression slightly paler brown than remainder of dorsum. Scutellum yellow with median basal dark brown spot, much larger in male than in female. Metanotum dark brown with pale grey dusting. Pleura dark brown with a broad whitish band from base of fore to base of hind coxæ.

Abdomen black, with all segments except basal—(and that also, faintly, in male)—with yellow bands to hind margins, broader in the male, in which the bands are present, indistinctly, on the venter, which is not the case in the female, which has the venter reddish brown. Male genitalia brown, with three black linear chitinous processes, one directed posteriorly, two laterally. Ovipositor brown.

Legs yellow, all femora with broad dark subapical rings. Tarsi blackened.

Wings clear, with dark spots at tip of auxiliary, below tip of first, and at tips of both branches of second vein. Discal cell closed. Halteres yellow with black capitella.

Long 4 mm.

Described from a male in fair condition, taken in pine woods, Shillong, on 9th October 1920; and a female, in good condition, taken among guinea grass, Suduganga, Matale, Ceylon, on 21st November 1919. Both in my own collection.

The spotted wings and banded abdomen easily distinguish this species from the only other Indian species with closed discal cell.

The species affords another link between the faunas of Ceylon and the Khasia Hills.

AMALOPIS NOVEMPUNCTATA, sp. nov. (Plate XV, fig. 5.)

♂. *Head yellow*, vertex with some longish concolorous and a few shorter darker hairs, frontal protuberance not prominent. Antennæ yellow, apical half of flagellum brownish, the joints after the first ill-defined. Scape hairy, flagellum with short whitish pubescence. Palpi dark brown. Proboscis yellow with tips of labella brown. Eyes apparently bare.

Thorax yellow, a dark ring at junction of head and neck. Prothorax very distinct, nodose, with longish black hairs on the sides of the protuberance. Mesonotum with slight, darker pile, and dorso-central rows of hairs as far as the suture. Around the suture are eight black spots arranged in a rough circle, the anterior pair dorso-central, smaller, the next pair presutural, towards lateral margins, larger, the next of same size, post-sutural and supra-alar, the hind pair large, dorso-central, but considerably before hind margin. In the centre of the circle, on mid line, its anterior edge resting on the suture, is a large black pentagonal spot. A short black streak on each side below the posterior corners. Pleura, scutellum and metanotum yellow, immaculate.

Abdomen yellow, with brown hairs. Second to sixth segments with a median ill-defined dorsal stripe, the lateral margins of second to fourth segments narrowly black, venter yellow, darkening to brown on fourth and subsequent segments, the third to fifth with short sub-basal black streaks submedianly. Genitalia dark yellowish, large, complex, with dark hairs.

Legs yellow. Tips of all femora, tibiæ and first three tarsal joints black, the latter very narrowly. Last two tarsal joints all blackish. Tibial spurs distinct, ungues yellowish.

Wings yellowish, costal, anal and axillary cells nearly clear. A very deep yellow stripe along both sides of first vein, edged blackish below, not reaching

to the fourth vein its lower edge parallel with first vein, with a black spot each side of sub-costal cross-vein, and a black streak over base of prefurca. Costal cell with numerous short black transverse flecks, the pattern differing in the two wings; some black suffusion around tip of auxiliary vein and along costal margin of submarginal cell. Below the tip of auxiliary the yellow colour around the first vein gradually turns brownish, and proceeds as a broad band to apex, its inner edge reaching margin in second posterior cell. This band contains a clear spot in outer half of marginal cell. A brownish suffusion over the cross-veins, with a branch from the base of the second sub-marginal cell to base of second posterior. Fifth vein with a brown streak lying just below it, and a pale brown spot over tip of seventh vein, reaching sixth vein above. Sub-costal cross-vein at one-third length of wing, marginal cross-vein just before tip of first vein, sub-marginal cells equal, discal cell open. Halteres pale yellow.

Long 11 mm.

Described from a unique male in good condition, taken on scrub in shade, Shillong, 9th October 1920. In my own collection.

The only point at variance with the generic definition is the non pubescent eyes. The pattern of wing and thorax amply distinguishes this beautiful species from all its known Oriental congeners.

LIMNOPHILA FLETCHERI, sp. nov.

♂ ♀. *Head* grey, vertex somewhat swollen, occiput with a postocular row of longish dark hairs well separated from eye margins behind and with the two rows not meeting on the vertex. Antennæ short in both sexes, pale brownish. Palpi black.

Thorax shining very dark brown, humeri pale yellowish. Prescutum with dorso-central rows of dark hairs. Pleuræ dark brown, grey dusted. Scutellum dark brown, metanotum paler with dark brown lateral margins.

Abdomen black, unmarked, slightly shining, with dark hairs. Male genitalia dark brown, female ovipositor with valves long, yellowish.

Legs: coxæ and trochanters blackish, remainder pale yellow brown, tips of femora and tarsi slightly darkened.

Wings uniformly grey, stigma absent. Subcostal cross-vein at tip of vein First vein ending free, though a line of hairs and a depression in the membrane shows its course to the margin and the position of the absent marginal cross-vein near its tip, half way from tip of prefurca to tip of upper branch of second vein. Prefurca hardly larger than upper branch of second vein. First sub-marginal cell nearly as long as second, which is as long as first posterior. Four

posterior cells. Discal cell as long as second posterior. Anterior cross-vein in line with basal section of third vein, at upper basal angle of discal cell ; posterior cross-vein at nearly half length of latter. Halteres pale, capitella blackened.

Long 4·5 to 5·5 mm.

Described from four males and two females taken as follows :—two males and one female in deep shade, Shillong, 15th October 1920, one male Cherrapunji, 18th October 1920 : a pair *in cop.* (type and allotype), in shade, Shillong, 20th October 1920. All in my own collection. The much longer discal cell sepatesra it from *parvicellula,* Brunetti.

LIMNOPHILA MULTIPUNCTIPENNIS, sp. nov. (Plate XV, fig. 6.)

♀ . *Head* greyish brown, occiput and frons with an indefinite median darker stripe. Antennæ, scapal joints blackish, large, flagellum pale brown with whitish pubescence, very thin, the whole antenna not more than twice as long as head. Palpi blackish.

Thorax bright yellowish brown, prothorax with sides darker and traces of a median dorsal stripe. Mesonotum with well-defined admedian dark brown stripes, which almost meet on the fore margin and run into one another just in front of the suture, where they terminate ; marginal dark brown stripes commencing at half the length of prescutum, and on postscutum broadening out. A very dark triangular median mark on suture. Presuturally dorsocentral rows of short hairs, arising from the middle at the pale stripes. A short brown bar presuturally above the notopleural suture, not visible from above. Pleura pale brown with an indefinite darker stripe from root of fore coxæ parallel to notopleural suture. Scutellum and metanotum dark brown the upper part of latter paler yellowish below the tip of the former.

Abdomen dark reddish to blackish brown, unmarked, anal segment paler. Ovipositor long, base black, tips of valves yellowish.

Legs pale yellow, tips of femora blackened. (Middle legs missing.)

Wings clear with very numerous pale brown spots. Subcostal cross-vein at tip of vein, marginal cross-vein incomplete, not reaching upper branch of second vein, prefurca long, commencing at one-third of the wing, five posterior cells, discal cell about twice as long as broad. Halteres pale brownish yellow.

Long 6·5 mm.

Described from two paratype females neither in good enough condition to be made the ultimate type, taken at Shillong on 2nd October 1920 (at light) and on 6th October 1920, in bungalow. In my own collection.

Very distinct from the hitherto described Oriental species.

RHYPHIDÆ.

Olbiogaster zeylanicus,* sp. nov. (Plate XIV, figs. 5, 13.)

♂. *Head* black, posterior eye margins laterally, sides of frons, lower half of frontal carina, and face, except for a large black median spot, yellow. Occiput and vertex swollen above, with longish hair, black on former, white on latter. Ocelli close together, the mid ocellus much larger than the two upper ones. Frons at widest (at level of antennæ), one-third width of head, somewhat narrowed at level of ocelli, depressed below level of eye margins, the lower half with a median protuberance, across which runs a carina to between roots of antennæ, shining black above, yellow below; remainder of black area of frons grey-dusted. Face, proboscis and palpi with short black hairs, the two latter concolorous with the former. Eye facets all equal. Antennæ as long as the body. Scape dark yellow below, black above, the basal joint rather wider, globose and three times as long as the apical. Flagellar joints black, distinctly paler beneath, with closely set black, bristly pubescence, the inner edges of each joint with very minute microscopic pubescence and about a dozen definite, widely separated, short, spiny bristles, in two or three rows, spaced more or less equidistantly in each row, the rows all close together. First joint about three times as long as broad, the next four times. The remaining twelve joints approximately as long as the second, but gradually and evenly narrowing to apex.

Thorax: neck yellow. Dorsum of thorax shining black with long white hairs. A triangular yellow area, enclosing a small black spot, on fore corners, humeral calli prominent, lobose, black with white hairs, the upper anterior half yellow. Postalar calli yellow. Dorsopleural suture broadly, the propleural and notopleural sutures narrowly, the pteropleuron and spots at base of fore and hind coxæ, yellow: remainder of pleura black. Scutellum and metanotum black, the former with apex broadly yellow.

Abdomen black, first segment broadest posteriorly, with white basal band, the extreme margin, which is produced into small lobes one each side of the metanotum, black, the whole with long white hairs. Second segment narrowest

* What is probably the female of this species has now come to hand. It differs from the male in that the flagellum is all black above and below, whilst the scape is yellow above in one specimen. The abdominal white spots are much smaller and less prominent. The hind tibial spur is double. In one specimen the hind femora are all black as in the male, the other the pre-apical yellow ring in the other, the outer third is yellow with black tip. Abdominal segments 6 and 7 and the ovipositor are reddish yellow.

The female differs therefore from Edwards' *O. orientalis* by the reddish sixth abdominal segment and the hind femora always blackened at least on basal half.

Two females, Sudagunga, Ceylon, on 12th March and 6th May 1922. In my own collection

apically, with white basal lateral spots. Third to fifth segments with parallel sides, as wide as tip of second segment, with basal lateral white spots, almost confluent medianly on third, entirely so on fourth, widely separated on fifth segment. Sixth and seventh segments swollen, laterally compressed, black except for the apical margin of latter, which is dull brownish. Laterally the second to fourth segments white, as are also the ventral bases of third and fourth segments, remainder of venter black. Abdomen beyond first segment with short hairs, white and black intermingled. Genitalia extremely assymetrical, twisted so that the whole apparatus faces the right side of the insect, the superior claspers white, the lower brownish yellow, the whole covered with white hairs.

Legs : fore coxæ and trochanters yellow, the former with base black. Posterior coxæ and trochanters black, the former of equal length in mid and hind pairs, and with dull whitish depressed areas on mid pair laterally and hind pair latero-posteriorly. Front femora all yellow, mid yellow with basal third blackish, hind all black except a brownish-yellow subapical ring, the extreme tip black. Anterior tibiæ and all tarsi pale whitish, appearing dark owing to closely set setulæ, fore tibia no longer than its femur and shorter than the metatarsus, with a single apical yellow spur. Mid tibiæ with apical spurs double. Hind tibia yellow, its tip black with a single apical spur.

Wings greyish hyaline, the apical third almost imperceptibly darker. Stigma black, a long dark streak through anterior cross-vein, and some suffusion over apex of discal cell. Venation as described by Edwards for *O. sackeni*, but the lower branch of fifth vein practically straight. Halteres pale whitish, the anterior margin of the shaft with a fan of bristles basally, and shorter, more widely set bristles exteriorly. A line of very short bristles on capitellum, not terminating at the tip.

Long (without antennæ), 8 mm.

Described from a unique male in good condition (one antenna and one foreleg damaged), taken on window, Suduganga, Matale, Ceylon, on 10th August 1921. Type in my own collection.

Whilst it is possible that this is the male of *O. orientalis* (Edw.), there are so many points of difference, especially in leg coloration, that I feel justified in describing it as new. It is twenty-four years since the still unique type of *O. orientalis* was taken ; and in several years collecting in this bungalow the presently described species has hitherto failed to make an appearance, so the chance of obtaining a pair *in cop.* and settling their identity or otherwise is extremely remote.

In life an extremely good hymenopterous mimic.

TABANIDÆ.

Tabanus kakhyenensis, sp. nov. (Plate XII.)

♂. *Head*: Eyes bare. Frons about eight times as long as it is wide anteriorly, and rather more than one-third narrower at that point. Frontal callus dark brown, very narrow, not touching the eyes, prolonged upwards linearly for two-thirds the distance to the vertex. In some specimens the callus is hardly wider than its extension. Sub-callus dull, paler yellowish white with median, impressed fine line. Frons and sides of face towards eye margins yellow-grey with black pubescence, which is thicker (the frons therefore appearing darker) on upper half of former. Face beneath antennæ grey-white with no tinge of yellow, smooth. Jowls with long white hairs. Antennæ: first two joints pale brown with sparce black pubescence and black hairs at upper edge of first and along apical margin of second joint: third joint yellowish to reddish tooth blunt but pronounced, with some black hairs at its tip, the four apical annulations darkened. Palpi grey with white pubescence, closely covered on outer sides with black hairs (which may be thinner basally, the palpi then appearing to have a pale base), not very broad basally, and with apex somewhat pointed. The inner sides appear nearly white by contrast.

Thorax: dorsum black, with golden and black hairs intermingled in approximately equal numbers giving the whole a dull brown appearance, unstriped. The swelling at each end of the suture with longer, black hairs only. Pleura slate grey with long whitish hairs, of which there are also some above the wing roots and on post-alar calli. Scutellum grey, very shortly pale golden pollinose, with black hairs. The apical margin more violet-grey.

Abdomen brown, with black hairs. The first two segments reddish brown, darkening to very dark brown on the posterior half of the third segment and to almost black on the sixth and seventh. Hind margins of the last five segments broadly but obscurely paler brown (with no shade of red in it). These paler margins not always apparent. On hind margins of second to fourth, sometimes to fifth, segments medianly, small, transversely elongate pale spots with white hairs. In some specimens the whole of the first three segments may be bright yellow brown. Venter similar. The first two to four segments red-brown, remainder blackish. All except apical segments with prominent pale hind margins, not always visible.

Legs black, except basal half of tibiæ, which are obscurely brownish: the junctions of femora and tibiæ always, of tibiæ and metatarsi sometimes, reddish. A fringe of short black hairs on posterior margins of femora.

Wings : Foreborder as far as tip of first vein yellowish, both basal cells slightly infuscated, except for a small elongate streak in upper basal corner of first, and two irregularly elongate streaks one each side of the fourth vein just before its fork in the outer corners of the cells. These streaks are more white than hyaline. Base of anal cell slightly yellow tinged. From tip of first vein a dark, often blackish, band extends to the upper (sometimes to the lower) branch of the fifth vein, bounded concavely exteriorly along the upper branch of the third to the tip of its lower branch, and completely covering the first four posterior cells, and the distal area of the discal cell to a varying extent. The depth of infuscation decreases posteriorly, usually becoming hardly noticeable in the fifth posterior cell. In one specimen the depth of the infuscation is much less, and the edges of the band are diffuse, the whole wing, except the tip, appearing yellowish brown with the bases of the first submarginal and posterior and discal cells clear. There are hyaline streaks in this band in the marginal, first submarginal and all posterior cells, all or any of which may not be apparent. Upper branch of third vein with an appendix, lower branch turned down to meet fourth vein considerably before the margin, thus making the first posterior cell petiolate. In one wing of one specimen the cell is closed only in the margin. Halteres yellow.

Long 13·5 to 18 mm.

Described from three females in good condition from Mohnyin Reserve, Katha, on 15th and 19th May 1919, both the specimens of the later date at light ; one female from Pyonchaung, South Toungoo, on 22nd May 1918, and two females from Yanaungmyin, Pyinmana on 3rd and 9th June 1918, all in Upper Burma, and all taken by C. F. C. Beeson, Forest Zoologist. Type from Mohynin, in Forest Zoologist's collection, as are all co-types except one in my own collection.

A male from Pyonchaung, taken at the same time as the female from that place differs considerably from the type female, but is obviously conspecific with one Yanaungmyin female, and so must be the male of this species. The upper and lower eye facets are sharply differentiated, and there are no traces of bands. The thorax shows no differences, but the first three abdominal segments are wholly, and fourth except at the sides, brownish yellow : venter similar. The distinctness and depth of colour of the subapical band of the wing occupies a position intermediate between the very diffuse Yanaungmyin specimen, and the typical specimens from Mohnyin.

This species would, I imagine, be included by Miss Ricardo in her Group V, in her table of Oriental species in *Indian Museum Records*, vol. IV, p. 113,—but it seems most closely allied to *T. nephodes*, Bigot, from the Naga Hills, from

which it differs by the greyish (not red), face and frons, the darker thorax and less distinctly marked abdomen, and the black legs. Miss Ricardo places Bigot's species in her Group VI.

HÆMATOPOTA BEESONI, sp. nov. (Plate XI, figs. 4, 5.)

♀. *Head*: frons yellow-grey with some black hairs below vertex, and some long white hairs between lower outer corners of paired spots and callus. Callus large, shining black, its lower margin evenly curved, its upper produced in the middle somewhat acutely. Paired spots large, barely touching the eyes and callus, unpaired spot small. A large black inter-antennal spot. Upper half of face with a broad black band passing round the antennæ, lower half pale grey with two small black spots in pit-like depressions. Palpi pale yellowish grey, with black hairs on outer sides and at tips, and longer, white, soft hairs basally. Antennæ, first joint yellow with black bristles; second small, cup-shaped, yellow, covered with black bristles; third very dark brown, paler at extreme base, the basal annulation slightly flattened, almost bare, the three apical black and nearly as wide as the tip of the first annulation. The first two joints together are as long as the third.

Thorax dark brown; a median and two subdorsal pale stripes, all stopping just beyond the suture, and, exterior to the latter, post-suturally, a pair of pale stripes which merge into the transversely pale prescutellar area. Shoulders and sides of dorsum pale, the whole with scattered pale silvery-yellow hairs. Pleura pale grey. Scutellum pale basally and darker on apical half.

Abdomen: the first three or four segments reddish-yellow, the apical ones dark brown. There are traces of a narrow median whitish line, only clearly visible on the apical half of the second and on the fourth and fifth segments, with ill-defined small whitish subdorsal spots on the fourth to the sixth segments. Apices of all segments very distinctly whitish. Venter yellowish basally and brown apically.

Legs: fore pair—coxæ grey, femora dark brown with a fringe of black hairs on their inner edges above and below, most noticeable on the apical third below; tibiæ white basally and black on rather more than the apical half, where there are some long black hairs; tarsi black. Middle pair: femora and tibiæ yellowish, the former with some long grey hairs on inner side, the latter with tip broadly brown and a not very well-defined middle brown ring; basal half of metatarsus pale, remainder of tarsus black. Hind pair: femora yellow with fringes of balck hair above and below, strongest below apically; tibiæ yellowish white on basal, black on apical half; metatarsus pale on basal half remainder of tarsus black.

Wings with apical band single, reaching from fore to hind margin, more or less interrupted in second submarginal cell. None of the rosettes very distinct. White apical spots in the first, second, third and fifth posterior cells, interior to which, before the rosettes, is a double row of small spots commencing in the second submarginal and extending to the fifth posterior cell. A zig-zag line, commencing at a Y-shaped fork in upper corner of anal cell, to the axillary region. The ground colour of the wing is much paler basally than apically. Halteres pale yellow with a brown spot on the capitellum.

Long 8 mm.

Described from three females, two in good condition, the third with the antennæ broken, taken by C. F. C. Beeson, Forest Zoologist, after whom I have much pleasure in naming it, at Bondaung, North Toungoo, Burma, the type on 11th May 1918, on the wing, the co-types on 17th May 1918, biting elephants. Type and one co-type in the Forest Zoologist's collection, Dehra Dun, other co-type in my own collection.

This speceis comes in Group III (B) of Miss Ricardo's paper on the Oriental species, but is amply distinct from *atomaria* Wlk. (Borneo) and *unizonata* Ric. (Ceylon Montane Zone) by the black facial stripe of great breadth. The antennæ are very like those of *unizonata*, but that species is larger and has the wing markings much more clear cut.

HÆMATOPOTA DEMELLONIS, sp. nov. (Plate XI, figs. 1, 2, 3.)

♀ .*Head*: frons yellow-grey with some pale hairs, the ocular margins white. Paired spots large, touching the eyes and frontal callus, white ringed above. Unpaired spot absent, a median white stripe from vertex half-way down the frons. Callus shining black, its upper margin straight except for a small obtuse median projection, the lower margin produced laterally around the antennæ, and the median inter-antennal black spot contiguous. Face ashy-grey, a pair of black spots above contiguous with the callus on a level with the antennæ, and at level of their lowest point a black fleck on each side. Palpi pale yellowish, with a few black hairs on outer side and at tip, and with long white hairs on outer side, especially basally. Antennæ not much longer than the head, the first two joints shining dark brown with some black hairs, the third paler, greatly incrassated on the basal annulation, almost bare except for a few very short black hairs at its upper basal angle. Joints approximately 4 : 1 : 8.

Thorax dark yellowish grey, almost greenish, with a single median and subdorsal pair of stripes, the two latter fading away between suture and scutellum. Lateral margins of dorsum also pale, the general appearance being

that of five pale stripes on a dark ground. Scutellum pale grey with well marked darker triangular admedian spots separated by a median pale linear area. Pleura darker grey.

Abdomen pale grey with well marked submedian dark brown spots forming a pair of stripes, their fore and hind margins on each segment slightly laterally produced, giving the outer margins a 'scalloped' appearance. Seventh segment all dark. The junctions of the segments very narrowly pale yellowish grey. Venter grey with broad median dark stripe, the segmental junctions narrowly white.

Legs: femora dark greyish brown with pale pubescence. Fore tibiæ pale at base and slightly incrassated in apical black half, posterior tibiæ ringed, the hind pair obscurely, the median pale ring being indistinct. Posterior metatarsi with basal half pale. No noteworthy hairs on the legs.

Wings pale grey, the markings not very distinct. Apical band double, the two halves joined on fore and hind margins. The first rosette only well apparent, but the second and third can be made out. Stigma dark brown. Halteres, stem pale and capitellum dark brown.

Long 6·5 mm.

Described from a unique female in perfect condition from Nova Góa, Portuguese India, taken in September or October 1920, by Major Froilano de Mello, Director of the Bacteriological Institute of that place, after whom I have much pleasure in naming the species.

This species comes in Group V, section B (a), of Miss Ricardo's paper on the Oriental species in *Indian Museum Records*, vol. IV, but is amply distinct from *H. javana* Wd., the only other species to fall into that subsection.

HÆMATOPOTA BURMANICA, sp. nov. (Plate XI, figs. 6, 7.)

♀. *Head:* frons yellow grey, an indistinct pale line from vertex to unpaired spot, and the ocular margins indefinitely paler. Paired spots hardly touching eyes or callus, unpaired spot small. Callus shining dark brownish black, obtusely produced above medianly, inter-antennal black spot present. Whole of upper half of face with a broad black band (in co-type the upper half of the band is brown, not black, between the eyes and antennæ), lower half of face pale grey with two small black triangular spots. Palpi pale yellowish, with black hairs on outer side and longer pale hairs basally. Antennæ: first and second joints shining yellowish with much black pubescence, third joint dark brownish black, paler at extreme base, which is only very slightly flattened. The first two joints are as long as the third.

Thorax: dorsum dark brown with indistinct pale median and subdorsal stripes, the latter stopping just beyond the suture, and exterior to them a pair of postsutural stripes. Scutellum brown, pleura dark grey.

Abdomen very dark grey, an indistinct pale median stripe and the sides of the segments indefinitely paler. Segmental margins narrowly whitish. Venter dark grey, unmarked.

Legs: fore pair black, coxæ with long pale hairs, and base of tibiæ pale. Mid pair: yellowish, tibiæ ringed, and tip of meta-and last four tarsal joints black; femora with soft pale hairs below and short black hairs at tip making this appear blackened. Hind pair: femora yellowish, darkened at base and tip, tibiæ concolorous, obscurely two ringed, tip of meta-and last four tarsal joints black; femora with a fringe of black hairs, very noticeable apically below, and outer two-thirds of tibiæ black fringed on the hinder edge.

Wings with all the rosettes distinct, the pale markings small. Apical band single, incomplete, stopping in second submarginal cell, there is also a pale spot on hind margin but this is always clearly separated from the band itself. A white ring with, dark centre exterior to the brown stigma. Traces of pale apical markings in first, second, third and fifth posterior cells, and at tip of anal vein in first axillary cell. Two zigzag lines in the axillary region. Halteres pale with brown capitella.

Long 7 to 8 mm.

Described from two females both in good condition, both taken at Bendaung, North Toungoo District, Burma, on 17th May 1918, biting elephants, by C. F. C. Beeson, Forest Zoologist. Type in Forest Zoologist's collection, Dehra Dun; co-type in my own collection.

This species will come in Group VI (F) of Miss Ricardo's paper on the Oriental species. It is very near her *H. hindostani* from the Bababuddin Hills in Mysore, but this species has the legs without noticeable hairs, as have both the other species in this section.

EMPIDÆ.

Tachydromia zeylanica, sp. nov.

♂. *Head* black, frons and occiput covered with shining white pubescence only visible in certain lights. A pair of fairly strong, widely separated vertical bristles, and two pairs of smaller, proclinate, ocellar bristles, the lower the longer, all brown, and an occipital row of bristles, stronger below the upper ones dark, the lower whitish. Antennæ dark brownish, the third, joint nearly three times as long as the first two together, with dark pubescence.

Extreme base of style dark, remainder white, the whole about half as long as the antenna. Proboscis half the height of the head in length, brown, palpi one-third the length of the proboscis, pale yellowish, with a white apical hair nearly twice the length of the palpus.

Thorax dull ferrugineous with minute pale pubescence. Anterior margin of dorsum darkened to blackish, from behind which a broad blackish stripe runs medianly to root of scutellum, towards which it fades into a general darkening behind the level of the wing roots. A chestnut brown subdorsal stripe, hardly reaching the dark anterior area. Pro- and meso-pleuræ ferrugineous, sterno- and hypo-pleuræ darker. From root of front to root of mid coxæ a band of more distinct, white pubescence. Scutellum and metanotum blackish, the posterior margin of the former paler, with an apical pair of bristles. A single, strong, noto-pleural bristle.

Abdomen dull brownish, with traces of ferrugineous laterally, and some sparse pale hairs. A tuft of stiff black hairs ventrally on the apical margin of the last segment. Genitalia swollen, and more blackly shining.

Legs bright yellow. Front coxæ with white pubescence on front side. Front tibiæ and tarsi dark brown, tips of hind tarsi black. The whole with short golden pubescence. Mid femora greatly incrassated.

Wings pale greyish, veins brownish, third and fourth not converging apically. Halteres yellow.

Long 2 mm.

Described from two males in good condition, taken on a hedge in evening at Emolina Estate, Maskeliya District, Ceylon (4,200 ft.), on 12th May 1919. Type and co-type in my own collection.

This species is most nearly related to *T. nepalensis* Brun. but is distinguished from that species by the thoracic pattern and the non-narrowed tip of the first posterior cell. It is the first species of the genus to be described from India south of the Himalaya.

REVISED KEY TO THE INDIAN SPECIES OF ELAPHROPEZA, Macquart.

1.	Thorax shining black	2.
	Thorax brownish yellow	3.
2.	Basal half of abdomen reddish yellow, apical half black ..	*basalis*, Bezzi.
	Abdomen wholly black	[illegible], Brun.
3.	Abdomen unicolorous, or base pale and apex darker ..	4.
	Abdomen with apex and base pale, middle area, black ..	9.
4.	Occiput blackish	5.
	Occiput yellowish	8.
5.	Tips of fore tibiæ all fore tarsi and last joint of posterior tarsi black. Wings smoky	*fuscithorax*, Walp.
	Legs practically unicolorous. Wings clear	6.

6.	Style thickly pubescent (bottle-brush-like)	*plumicornis*, sp. nov.
	Style normally microscopically pubescent	7.
7.	Thorax with supra-alar and two pleural black spots ..	*notatithorax*, sp. nov.
	Thorax uniformly ferrugineous yellow	*abdominenotata*, sp. nov.
8.	Third antennal joint black	*ferruginea*, Brun.
	Third antennal joint yellow	*distincta*, sp. nov.
9.	Occiput yellow	*nigropunctata*, sp. nov.
	Occiput black	10.
10.	Tips of tibiæ and tarsi brownish	*metatarsata*, Bezzi.
	Legs wholly yellow	*variegata*, Brun.

ELAPHROPEZA PLUMICORNIS, sp. nov. (Plate XIV, fig. 9.)

♂. *Head*: frons and occiput blackish grey. Ocellar bristles long, cruciate. verticals inwardly directed, occipital row fairly strong, all pale. Antenna, first two joints brownish, third, except extreme base, blackish. Style thickly pubescent and nearly twice the length of the antenna, quite unlike those in the other described species, in which it is only microscopically pubescent, in accordance with the generic character. Proboscis and palpi ferrugineous.

Thorax bright reddish ferrugineous, with short pale hairs, unmarked, save for an indefinite arcuate black line in the position which the transverse suture would occupy, if present. Scutellum concolorous, metanotum darker reddish-brown.

Abdomen dark reddish brown with pale pubescence, venter more yellowish.

Legs yellow to tips of tarsi, the outer half of the hind femora slightly darker. Hind tibiæ with a distinct hood-like process on inner side over the metatarsal articulation.

Wings yellowish, the costa strongly ciliate as far as the tip of the first vein, the second vein ending slightly beyond half way between the tips of first and third veins. Anterior cross-vein and fourth vein very weak until the latter is the length of the posterior cross-vein past its junction therewith. Halteres all yellow.

Long 2 mm.

Described from a unique male, in good condition, taken on a hedge at Suduganga, Matale District, Ceylon, on 18th January 1920. Type in my own collection.

Easily distinguished by the 'bottle-brush' plumosity of the style. A female *E. fulvithorax* (v. d. W.) was taken during the same month in the same place, but this species (of which I also possess the male) is amply distinct by the much darker wings, the darkened front tarsi and the bristles on the posterior side of the hind tibiæ, which are apparently absent in my species.

ELAPHROPEZA NOTATITHORAX, sp. nov. (Plate XIV, fig. 10.)

♂. *Head*: frons and occiput very dark brown. A pair of proclinate ocellar bristles, on a level with and exterior to which is an erect bristle on each side. Verticals somewhat forward-directed, occipital bristles very short. Antennæ, basal joints yellow, third blackish, the style twice as long as the antenna. Proboscis and palpi very short, brownish yellow.

Thorax reddish ferrugineous yellow, paler pubescent. A black spot dorsally above and in front of wing roots on each side, and similar ones over roots of mid and hind coxæ. A general darkening on metapleura. Scutellum concolorous, a narrow black basal area. Metanotum blackish, sometimes paler brownish in middle underneath the scutellum.

Abdomen with basal segments yellowish, apical dull blackish, the whole with short stiff dark hairs. Genitalia small (contracted), yellowish.

Legs uniformly yellow. Tip of hind tibia with a pair of strong black curved spines on anterior margin, on posterior margin a sort of flap, outlined in brown, closely appressed to shaft of tibia over the metatarsal articulation.

Wings hyaline greyish, veins yellow. Anterior cross-vein and fourth vein weak from base to about the length of the posterior cross-vein beyond its junction with the latter. Ciliation of the costa strong as far as tip of first vein or a little further. The second vein ends exactly midway between first and third. Halteres, stem yellow, capitellum blackish.

Long 1·5 mm.

Described from two males in good condition, taken on a window at Suduganga, Matale District, Ceylon (1,386 ft.), on 29th May 1919, and 12th September 1920. Type and co-type in my own collection.

ELAPHROPEZA ABDOMINENOTATA, sp. nov.

♀. *Head*: occiput and vertex black, the latter with greyish shimmer; face more greyish. Occiput somewhat swollen. Vertical and ocellar bristles procumbent. Antennæ, first joint pale yellowish, second and third dark brown, the former with apical setæ, the latter pubescent. Style one and a half times as long as antenna, moderately pubescent. Proboscis half height of head, brownish yellow, palpi white, with some apical hairs, incumbent on proboscis, and half its length.

Thorax shining ferrugineous, unmarked, dorsum very slightly darker in shade. Pleura, scutellum and metanotum concolorous, except for a small black area on metapleuron between base of halteres and side of metanotum.

Abdomen first three segments pale dirty whitish yellow, a pale greyish brown spot at extreme edge of dorsal margin on second and third. Remainder

of dorsum brownish, with short pale pubescence. Venter uniformly pale dirty whitish yellow.

Legs yellow, anterior tibiæ and tarsi and hind tarsi slightly darkened, also junctions of posterior femora and tibiæ. Fore coxæ with two basal bristles on front margin, mid femora with a preapical bristle and the underside with short spiny bristles, mid tarsi with strong, short, black spines and an apical tooth. Hind femora on upper side basally with three strong bristles, otherwise only with soft hairs above and below : tibiæ with two strong bristles equidistant from one another and each end of the joint.

Wings hyaline, costal cilia rather long and widely spaced as far as end of first vein, beyond which they are shorter and more closely set. Second vein ending at one-quarter to one-third of distance between first and third. Halteres pale yellowish

Long 1·25 mm.

Described from a unique female in good condition, taken on window, Suduganga, Matele, Ceylon, on 23rd August 1921. Type in my own collection.

Elaphropeza distincta, sp. nov.

♀ . *Head* yellow, frons narrow but distinct. Ocellar triangle with two pairs of bristles, one erect, one porrect. Verticals two pairs, the inner small, converging, the outer long, nearly parallel. Proboscis short, yellow ; palpi whitish with subapical black bristle, not as long as proboscis. Antennæ wholly yellow, the third joint short, not much more than twice the length of the second. Style yellow with the usual microscopic pubescence.

Thorax and scutellum uniformly yellow, the latter with a pair of strong parallel apical bristles. Metanotum dark with middle area ferrugineous.

Abdomen yellow, the apical half of dorsum with brown patches, the tip upturned, anal lamellæ yellow, small.

Legs uniformly pale yellow.

Wings clear, the tip of second vein nearer that of first than of third. Halteres yellow.

Long 1·5 mm.

Described from a unique female in good condition, taken on window, Suduganga, Matale, Ceylon, on 12th September 1921. In my own collection.

Elaphropeza nigropunctata, sp. nov.

♂ . *Head* yellow, the very narrow frons more brown. Ocellar bristles strong, proclinate, verticals strong, widely separated, erect. Between the ocellar triangle and the vertex are two pairs of small proclinate bristles. Occipital

row situated well behind eyes, fairly strong, ending in a strong genal bristle. All bristles yellowish. Antennæ, the two basal joints yellow, the third dark blackish brown, with extreme base more yellowish. Proboscis and palpi yellowish.

Thorax bright ferrugineous yellow, unmarked dorsally, but with a large black spot on hypopleura. Scutellum and metanotum concolorous, the former with a large black spot occupying all but its lateral margins, the median area of the latter broadly brownish-black.

Abdomen with segments 1 to 3 and 5 and 6 whitish yellow, the fourth segment nearly as long as the first three together, black with pale hairs. Genitalia dark brown above, ventrally yellow.

Legs yellow, front tibiæ and tarsi, mid tarsi, processes at tips of hind tibiæ, and last four tarsal joints, very slightly browner. Hind femora with about seven strong yellow bristles basally above, and about four short black spines on underside subapically. Hind tibiæ with two strong bristles towards middle of posterior margin, and their apex produced behind the articulation of the metatarsus on inner side into a short blunt process. Hind metatarsus somewhat incrassate, with two longish bristles on inner side before the middle.

Wings faintly tinged yellowish, the costa strongly bristled as far as the end of the first vein, whence their length decreases to normal ciliation a little way beyond the tip of the second vein, which is situated at one-third the distance between the tips of first and third veins. Halteres yellow, capitellum elongate.

Long 2·5 mm.

Described from a unique male in good condition, taken on the wing round flowers at Maskeliya (*circa* 1,050 ft.), on 25rd February 1919 (G. D. Arbuthnot). Type in my own collection.

PHORIDÆ

Aphiochæta flaviventroides sp. nov.

♀. *Head*: frons yellow, grey dusted, with scattered short black hairs, eyes antennæ and palpi all bright yellow. Ocellar tubercle distinct, black, the two upper ocelli dividing the vertex into three approximately equal lengths. Frontal groove weak but distinct. All bristles black. Verticals two, situated midway between edge of eye and upper ocellus on each side, strong, divergent: upper frontals four, in a straight line, lower frontals in two pairs, the bristles of each side approximated to one another and to eye margins, the inner pair slightly lower, inclined inwards towards one another, very little above the

level of the upper proclinate pair, which are much larger than, and very slightly exterior to, the very small lower pair. Arista dark brown, minutely plumose.

Thorax bright yellow with black pubescence, stronger and thicker towards the sides and hind margin of the dorsum, leaving a broad median stripe which appears a brighter yellow viewed from behind; some indefinite infuscation, medianly before root of scutellum which is slightly darker yellow, bare. Pleura very pale whitish yellow, bare. All bristles black, a humeral, three notopleural close together, an anterior supra-alar,—(these four in a straight line gradually ascending posteriorly)—two posterior supra-alar, the anterior very small and in a line with outer edge of base of scutellum, the posterior very strong, on hind corner of dorsum; a prescutellar dorso-central pair and a subapical scutellar pair, these last two pairs somewhat erect. Metanotum black, with some brownish tinge towards hind margin.

Abdomen: dorsum and sides very dark brownish black, second and third segments broadly dull brown basally, venter as far as sixth segment bright yellow: seventh and eighth segments small, all black, except extreme dorsal base of former, brownish, and hind margin, pale greyish, dorsally and laterally. Ovipositor small, yellow, hairy.

Legs pale yellowish white, hind femora black at tips and hind tarsi slightly darkened. Mid tibia with a single long spur, hind tibia with two spurs, of which one is half the length of the mid spur, the other very small.

Wings clear, veins yellow. Auxiliary well distinct, downcurved into first at half the length of the latter, third ending at middle of wing, the fork wide, first discal evenly curved, second and third bisinuate, the former strongly, fourth straighter, all reaching the margin. Costa with a very strong basal bristle, then about six very small ones, and about seventeen rather widely spaced bristles of considerable length. Halteres yellowish.

Long 1·25 mm.

Described from a unique female in good condition at time of description, now headless, taken at Cherrapunji, Khasia Hills, on 18th October 1920. In my own collection.

Separates at couplet K K of Brunetti's table of Oriental species on the yellow venter.

PHORHYNCHUS CINCTIVENTRIS, sp. nov. (Plate XIII, figs. 3, 6, 7.)

♀. *Head*: vertex, frons and face at sides shining black, centre of face, and some mottling on lowest quarter of frons, orange. A vertical row of four bristles in a straight line, two, admedian, below lower ocellus, two, exteriorly

at centre of frons, four in a curved row, its convexity downwards, at two-thirds length of frons, and a median pair, their bases closely approximate, just above epistomal margin, from which there runs an impressed line between these bristles on lowest quarter of frons. An occipital row of bristles and a very strong genal pair, the shorter anteriorly, the longer posteriorly directed. All bristles black, the frontal all reclinate. Eyes minutely pale pubescent. Antennæ, palpi and proboscis orange. Antennæ with third joint very large, hiding the others, pyriform, acuminate, slightly infuscated at tip. Arista long, bare, of two joints, the first minute, basally brownish, remainder black. Palpi with two strong bristles at tip, lower edge with two strong bristles towards tip and a basal row of quite small bristles. Proboscis as in generic diagnosis, slightly darkened towards tip above.

Thorax with dorsal margin very square-cut. Dorsum black, postalar calli yellowish, with closely set black setæ. Pro-, lower half of mesopleuron, and pteropleuron, black, upper half of mesopleuron grey pruinose. Sternopleuron yellow, hypo-and meta-pleuron yellow with white pruinosity, the front margin of former with a large spot of black contiguous with the same colour on pteropleuron. Anterior spiracle prominent, pale. Two propleural bristles, a humeral, a notopleural, two supra-alar and one post-alar and a prescutellar row of six, all strong and black. Scutellum black, bare, with four strong black marginal bristles, the outer pair situated midway between base and inner pair. Metanotum dull black.

Abdomen: basal segment dull yellowish, hind margin with a whitish band, narrowed at centre of dorsum. Second to fourth segments black, fifth yellow, sixth black with extreme hind margin yellowish, seventh and eighth seemingly forming part of the ovipositor, the former with hinder margin very narrowly pale, and each with a lateral bristle. Ovipositor cylindrical, acuminate, slightly chitinized, pale yellowish white, with two long bristles on dorsal margins towards the base, and an apical ring of long hairs, the whole organ covered with small bristles.

Legs: front pair throughout yellowish white. Posterior coxæ yellow—(the hind coxæ are partially concealed by the very incrassate hind femora)—mid femora and tibiæ pale yellowish, tarsi darker, really owing to more closely set setulæ. Hind femora with rather more than basal half yellow, outer half and extreme upper edge, which is shortly pectinate, throughout black. Hind tibiæ yellow, but appear black with extreme base only yellow owing to the very closely set setulæ; hind tarsi yellowish. Anterior coxæ bristly at apices, front tibiæ with a single bristle on anterior edge towards the middle, posterior tibiæ with a similar bristle and three apical spurs. All

tarsal joints with apical bristles, and front metatarsus and posterior first two tarsal joints with a longitudinal row of small bristles in addition. The whole of the legs, except coxæ, minutely black setulose.

Wings yellowish-grey, the apex very slightly infuscated. Venation as in *P. ater*, but the third and fourth discal veins are hardly bisinuate. Halteres pale yellow.

Long 5·5 mm.

Described from a unique female, in good condition, taken flying round a bush in the Royal Botanic Gardens, Peradeniya, Ceylon, on 23rd May, 1920.

Type in my own collection.

This peculiar genus seems to be confined to Ceylon.

TRYPETIDÆ.

Mellesis polistiformis, sp. nov. (Plate XV, fig. 9.)

♂. *Head* dull brownish yellow, frons exceeding in width one-third of head, paler yellow, vertex brownish with short white pile, ocellar triangle black. Below triangle, to middle of frons, runs an indefinite, very slightly darker bar, caused by there being a pair of admedian patches of almost imperceptible pale pile with a few very short white hairs. At middle of frons a transverse, irregular brown spot near eye margin on each side, prolonged inwardly as a narrow streak, but not meeting in the middle. Junction of face and frons at level of antennal roots with an elongate brown spot between eye margins and suture. Frontal lunule darkened. Face distinctly convex, almost yellow, knobbed immaculate, except for a brown transverse stripe along epistomal margin, the ends of which are upturned to meet antennal grooves. A brown spot at lower corner of eye at junction of parafacialia and genæ. Facial suture with a row of short pale hairs. Bristles golden brownish : verticals two, ocellar wanting, upper orbitals wanting, lower orbitals two pairs, the upper reclinate, at level of and exterior to mid frontal spots, lower proclinate, inwardly directed, in line with highest point of lunule, both pairs small. Lower middle area of frons with some scattered short brown hairs. Genal bristle strong, occipital row short, of a few bristles only. Antennæ dark yellow, arista black with yellow base. Palpi yellow, with a few pale hairs, proboscis brown.

Thorax reddish yellow, with short golden pubescence on dorsum and whitish hairs on pleura. Transverse suture broadly interrupted towards the middle, its anterior side with a pale yellow stripe crossing posterior half of mesopleuron and ending as a yellow spot on upper edge of sternopleuron.

Hypopleural spot, large, pale yellow, single, above it an indefinite dark spot each side of the brown metanotum. Scutellum pale yellow, very narrow. Chætotaxy greatly reduced,—only posterior notopleural, two postalar and two scutellar bristles, all brownish yellow.

Abdomen strongly pedunculate, with apical segments clavate, reddish brown with thick covering of golden hairs. First segment with its bilobed base and its apex paler yellowish, second with median paler stripe on posterior half and paler hind margin, third darker medianly, and with a fan of strong yellow bristles laterally, fourth and fifth with anterior margins blackened. Sides and venter unmarked, save for a paler yellow area laterally on second segment. None of the abdominal markings well defined, the colours shading into each other. Genitalia small, dark brown, retracted.

Legs brownish yellow, bases of posterior femora and tibiæ and all tarsi paler, whitish yellow. Fore femora with three long strong black spines below mid tibiæ with a single strong black apical spur.

Wings yellow, fore margin above fourth vein intensely so, axillary region clear. A subapical triangular black spot, based on costa between tips of second and third veins, with apex in middle of first posterior cell midway between the tips of the cross veins. Second section of fourth vein straight, second basal cell about four times as long as wide, first basal cell ciliate above second. Anterior cross-vein in line with tip of first vein, beyond middle of discal cell. Anal cell with its apex enormously drawn out, its tip hardly more distant from the margin than is the lower end of the posterior cross-vein. No supernumerary wing lobe. Halteres pale yellow.

Long 9·5 mm.

Described from a unique male in good condition taken at Sukna, 500 ft. (base of Eastern Himalayas), (H. A. Inglis) on 4th December 1920. In my own collection.

Bezzi's original definition of *Mellesis* (*Bull. Ent. Res.* VII. 144) would exclude this species on account of the spined fore femora, but in his more recent key to all the genera of the *Dacinæ* (*Phil. Jo. Sci.* XV. 415), he admits species with spinose femora to the genus. In favour of this species being correctly located here are the interrupted transverse suture, straight fourth vein and absence of acrostichals; against it is the convex face, as in *Mogoura crostichus*, Bezzi. However it has more affinities with *Mellesis* than with the latter genus, though in some respects it forms an annectant link between them. In Bezzi's table of Indian species of *Mellesis* it separates on the spined femora refusing to fall into either portion of couplet 1 (4), possessing as it does characters contrary to either line of the couplet.

Enderlein (*Zool. Jarhb. Jena, Abt. Syst. Zool.* XLIII. 336-360; 1920) has recently described *Polistomimetes minax*, gen. et sp. nov., from Sikhim, the descriptions of which I have been unable to consult. Until the 'Higher Command' of Zoology makes a definite pronouncement in regard to the acceptance or otherwise of post-war German work I feel justified in describing without reference to it.

STAURELLA LUTEIFASCIATA, sp. nov. (Plate XIV, fig. 2.)

♀. *Head*: vertex yellow, frons concolorous, its middle below slightly brownish, with a black, diamond-shaped patch, its upper angle truncate across a line just touching the lower edges of the posterior ocelli, between which the black area is slightly produced upwards, its lateral angles at the upper fronto-orbitals, and produced above them obliquely to eye margins as brownish ill-defined streaks, its lower angle just above the level of the middle pair of lower orbitals. Face concolorous, strongly concave, epistome prominent. Genæ concolorous, also lowerî hal of occiput, the upper half of which is black, save for a vertical lunulate yellow area continuous with the vertex and extending somewhat below the postverticals. Antennæ with first two joints yellowish, the third with extreme base concolorous, the remainder orange, three times as long as the second joint, with tip acuminate. First joint apically setose, second with the whole of the upper surface bristly. Arista brown, basal joint more orange, very short plumose. Palpi yellow with four or five strong bristles. Ocellar bristles absent, verticals strong, inner pair parallel, outer divergent, postverticals parallel. Orbitals 1 : 3, the upper erect, the lower porrect and inwardly directed. The uppermost lower orbital is on a level with, but external to, the upper orbital. The distance from the uppermost to the middle lower orbital is twice that from middle to lowest. Occipital row weak. Genal strong. All black. Eyes in life purple, with green bands in the form of a Maltese cross.

Thorax chestnut brown. Dorsum flattened, with fine black hairs. A median pale yellow stripe, narrower anteriorly, from suture to apex of scutellum, evenly broadened, so that on the scutellum, which is concolorous with the thorax, it occupies the middle third. A black admedian stripe starting from a black patch above the scapular bristle, interrupted over the posterior half of the presutural area, and again broadened out from dorso-central bristle to posterior margin, not continued on to scutellum. From just within the upper posterior supra-alar to level with the dorso-central a short, subdorsal brown stripe. Pleura chestnut brown, the dorso-pleural suture with a yellowish-white stripe from humerous to wing root, anteriorly broadened to cover all the former, and slightly so towards the latter. Metanotum dark castaneous with

median black stripe. Bristles black: humeral 1, notopleural 2, presutural wanting, dorso-central present, supra-alar 3, mesopleural 2, prepleural strong, sternopleural strong. Scutellum with two basal and two apical bristles all strong and parallel. Its upper surface is flattened like the thorax dorsum.

Abdomen castaneous brown, the sides of the dorsal surface of the first three segments black, the base of the fourth slightly more broadly, and the whole of the fifth except a median bar and the extreme hind margin, also blackish, but the markings on the two latter segments only visible when light falls on them from the side. Venter paler brown, a median black stripe broadly on first two segments and the hind margin of the fifth darkened. Ovipositor as long as and concolorous with abdomen, circular in section, as broad as last segment basally, apically acuminate, with a black band all round the tip.

Legs uniformly yellowish. The bristles of the fore femora strong above, fewer and weaker below.

Wings: stigma brownish yellow. From just beyond tip of first vein a marginal dark border, much broader apically, shortly but definitely interrupted at tip of third vein, extends to middle of second posterior cell. Over posterior cross-vein and last segment of fifth vein a dark stripe, broadened around upper end of cross-vein and on wing margin. A very faint infuscation, rounded over lower end of anterior cross-vein. Anal cell slightly shorter than second basal, anterior cross-vein at more than half the length of the discal cell. Base of third vein with about five bristles. Halteres yellow.

Long, with ovipositor, 6 mm.

Described from a unique female, in perfect condition, taken on window, Suduganga, Matale, Ceylon, at dusk on 17th August 1921. In my own collection.

This species fully accords with the generic diagnosis, save for the acuminate tips of the antennæ, agreeing with *S. nigripeda* in the position of the anterior cross-vein.

Staurella zeylanica, White.

In my description of this species I was in error in stating that the third vein possesses only two basal bristles. This is so as regards the lower surface, but the upper surface has the vein bristly to beyond the anterior cross-vein.

This would make the species run out at *Ptilona* in Bezzi's key, but it is excluded from Wulp's genus by the presence of the dorso-central and the number of orbital bristles. The head, too, is slightly wider than high. As it agrees with *Staurella* in thoracic chætotaxy I leave it therein, in spite of the bristles of third vein being at variance with Bezzi's definition of his genus.

RIOXA PUNCTATIPLEURA, sp. nov. (Plate XIII, fig. 4.)

♂ ♀. *Head* yellow, a median brown facial spot above epistomal margin. Antennæ and palpi concolorous, proboscis brown. Verticals two, postverticals parallel or slightly diverging, orbitals 2 : 1, but there may be adventitious smaller bristles above and below the lower. The upper superior orbital much shorter than the lower. Ocellar absent. All yellow. Occipital row of thin, pointed, yellow bristles.

Thorax yellow, with pale pubescence except over black areas. A presutural sub-dorsal ovate black spot, a post-sutural dorso-central black bar, interior to which with its tip in line with the tip of the bar is an elongate black spot, which may be fused with the bar, thus making its anterior end spatulate. Before root of scutellum the end of the bar is in-curved, and between the two ends on each side there is sometimes a median brown spot. Sometimes the two in-curved ends and the median spot fuse to form a complete cross-bar, when the post-sutural thoracic markings all unite into a U-shaped mark. Pleura yellow, a large black spot on anterior margin of mesopleuron, another occupying most of central area of sternopleuron, another the lower half of pteropleuron, and another on the hypopleuron. Mesopleural bristle single, pteropleural strong. Scutellum pale yellowish, six bristled, the middle pair weaker and the apical pair crossed. All thoracic bristles yellow. Metanotum with sides and centre pale, and sub-dorsal broad dark brown bars.

Abdomen yellow with pale pubescence. Third, fourth and fifth segments with basal black bands more or less interrupted at the middle of the dorsum the band on second segment often weak or absent. Ovipositor brown with yellow apex, about as long as last two segments.

Legs all yellow.

Wings with three oblique yellowish grey bands, the first from tip of the subcostal vein slightly zigzag over tip of second basal and anal cells, fading in axillary region ; the second starting broadly on the costa before the tip of the second vein, and running obliquely over anterior cross-vein into discal cell ; the third starting on the costa about half way between tips of second and third veins above, and from tip of fourth vein below, running over posterior cross-vein and fading away in third posterior cell. Subcostal cell and extreme base of wing yellowish. Veins yellow, the second through the middle band, the fourth beyond posterior cross-vein, the latter, and the basal cross-vein, black. First vein bristly to tip, third vein to midway between anterior cross-vein and tip.

Long 5·5 mm.

Described from 2 males and 3 female paratypes, none of them in good enough condition to be regarded as the ultimate type, taken in Colombo in July, November and December 1914. In Colombo Museum and my own collections.

This species does not belong to *Rioxa*, *sens. strict.*; but that genus is now, as regards the Oriental forms, merely an assemblage of species awaiting the specialist for proper dismemberment.

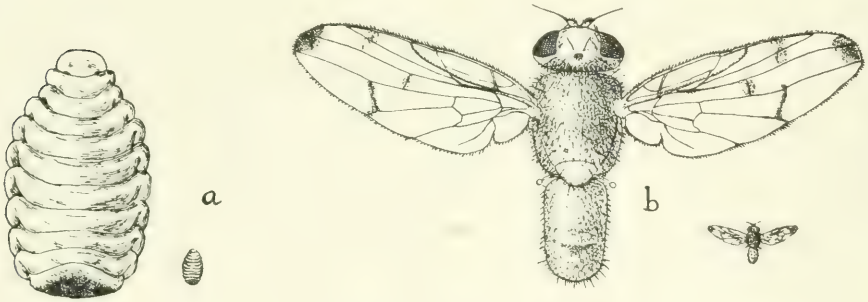
In the generic definition Bezzi (*Mem. Ind. Mus.* III. 111), states that the cephalic bristles should be black, but proceeds to add to the genus *the stellata* group, in which some of the frontal bristles are yellow. Edwards adds to the genus *flavicans*, exhibiting a totally different wing pattern, but his description is insufficient, as it is silent on the subject of bristle coloration (*Jo. F. M. S. Mus.* VIII. 50). The presently described species also has the wing pattern different from the species included by Bezzi, and further is at variance with generic characters in the single mesopleural and strong pteropleural bristles, and the shortened anal cell. The all yellow head bristles are quite exceptional. Against its belonging, however, to Bezzi's second section of the family, which divides on this character, are the spiny third vein, pectinate arista, six-bristled scutellum, and a wing pattern which is equally at variance with *Tephritis* and *Tephrostola*, the only two possible genera which could receive it.

The publication of new species in all families, as they come to hand, which is the purpose of the present series of papers, is only justified from the systematic point of view in that it calls attention to the many aberrant forms which the Indian Fauna produces, and provides Specialists with material on which to build up a sufficient knowledge for proper generic conception in their particular groups. Unless a new species is so totally at variance with all known genera that it utterly fails to fall into one of them in its widest sense, the erection of new genera in such papers is, to my mind, quite unjustified and a hindrance to the specialist, hence I leave the present species in *Rioxa*, contenting myself, as I have done in other instances, with pointing out its discrepancies from the generic definition.

Tephritis tribulicola, sp. nov.

♂♀. *Head* yellow, frons wider than one-third of head, slightly narrowed below, varying from pale lemon to dark orange yellow, usually darker in ♀ with a darker luniform mark, convexity upmost, across its middle, from centre of which projects a short line towards the ocellar triangle, and occasionally towards the antennæ also, this mark often not being apparent in the darker specimens. Ocellar triangle darkened. Face pale, in some specimens almost

white. Antennæ yellow, the basal joints paler, with black bristles, the third joint bare, one and a half times as long as the second, rounded apically, with bare arista, which has the rather enlarged first joint orange, the second black. Bristles: verticals strong, the inner pair parallel, the outer divergent, brown; postverticals parallel, very pale yellow, not much longer than the adjacent bristles of the concolorous occipital row; fronto-orbitals 2 : 3, the upper brown, the lower black,—(the type ♂ has an adventitious fourth lower bristle on one side between the upper and lower sets); ocellars strong, black; genal strong, brown. Parafrontalia with short white hairs, only visible from above; lateral epistomal margins with black, and genæ with white hairs. Palpi and proboscis yellow, the former with short black apical bristles.



Tephritis tribulicola.

a, Larva in hibernating condition, natural size and magnified (×6½).
b, Fly, natural size and magnified (×6½).

Thorax: dorsum yellow, the whole of the disc with an oblong black patch, leaving only all the margins yellow, the black colour extended forward on the mid-line to the neck as a black stripe, and incised at the suture, and, triangularly, on hind margin between the prescutellars, which stand on its hinder edge. These markings are only clearly visible in rubbed specimens, in fresh ones the dorsum is too thickly covered with very pale rather broad hairs, and in life appears olive green. Four small black spots at the insertions of the dorso-centrals and prescutellars. Pleura from pale to dark yellow, sterno- and hypo-pleura with large black spots covering most of their lower halves, that on the former with a patch of pale hairs. Scutellum equilateral triangular yellow, darkened basally. Metanotum with a transverse yellow area immediately below the scutellum, the remainder black, with a linear black stripe running from below across hinder edge of metapleura, in front of root of halteres and posterior stigmata, to upper margin of hypopleura. Chætotaxy complete,

two mesopleural; ptero- and sterno- pleurals strong, black, other bristles brown. Scutellum four-bristles, the apicals parallel and as strong as the subapicals, all brown.

Abdomen: dull yellow, with whitish bristles, appearing olive green in life. In the male the basal margins, dorsally of the second to fourth segments is very indefinitely darkened, the fifth has basally two admedian and on each side a marginal black spot, well distinct. Lateral margins of third to fifth segments strongly bristly. In the female the bases of all the segments are often blackened, but in unstained specimens the fifth and sixth (sometimes also the fourth), show a pair of basal admedian black spots, of which those on the sixth may be confluent. Fifth segment with lateral, sixth with lateral and dorsal hind margins with strong bristles. Male genitalia yellow, the type (taken *in cop.*), has a coiled concolorous tubular process, as long, if unrolled, as the whole abdomen, which is of an increased diameter apically, otherwise normal, small. Female ovipositor as long as the preceding four segments, brown, with black pubescence and tip, strongly flattened dorso-ventrally.

Legs: uniformly pale yellow.

Wings: hyaline, lightly brownish infuscated as follows:—stigma (outer edge of which is often considerably darker): very indefinitely over upper outer angle of second basal cell: over anterior cross-vein, at tip of second vein: and with apex more definitely blackened. In addition there is a brownish band commencing on costa midway between tips of first and second veins, interrupted in first posterior cell, and continuing along posterior cross-vein. Anterior cross-vein not much beyond middle of discal cell, and only very slightly distad of tip of first vein. The cross-veins not parallel, the posterior sloping slightly inwards posteriorly. Anal cell with acuminate point, as long as second basal. Third vein with two small bristles at its origin. Halteres pale yellow.

Long, without ovipositor, 6 mm. Ovipositor 2 mm.

Described from four males and six females mostly in good condition, taken on thistle at Shillong between 25th September 1920, and 7th October 1920, and at Mawphlang on 10th October 1920, by the Imperial Entomologist and myself. Type male and allo-type female taken *in cop.* on the same plant, 7th October 1920. Type and other specimens in my own collection. A considerable number, taken on the same plant at Shillong in previous years, in the Pusa collection seen by me. Except for the non-parallelism of the cross-veins this species agrees well with the genus *Tephritis* Latr., the much reduced wing pattern, however, is very different to its Indian congeners, and is more like *Zonosema* Loew,—but it cannot be allocated to that genus on account of the pale occipital bristles, the costal spine, and the double mesopleural

bristle. In Bezzi's key to the Indian species of *Tephritis* this species runs to couplet 5 and separates from *zonogastra* Bezzi on the very different wing pattern.

In life the species resembles a greenish *Chætodacus*.

TRYPANEA PENTADACTYLA, sp. nov. (Plate XV, fig. 10.)

♂. *Head*: pale yellow, frons white-dusted, occiput with a black V-mark from vertex to neck. Antennæ, proboscis and palpi yellow, the first with the third joint short, acumitate with black, bare arista of which the extreme base is yellow. Orbitals 1 : 3, the uppermost of the lower range further from eye margins and distinctly darker.

Thorax: dorsum, scutellum and metanotum pale slate grey, the two former with whitish bristles. Pleura greyish, with yellow pollen. Chætotaxy complete, scutellum with two bristles.

Abdomen: grey, with yellowish pollen and whitish bristles. Genitalia small, brown.

Legs all yellow.

Wings: costal bristle very strong. A dark bar from tip of auxiliary vein to middle of first posterior cell, leaving the extreme tip of first vein and first half of costal edge of marginal cell clear. Outer two-thirds of sub-marginal cell are darkened except for a clear dot above the anterior cross-vein and two spots on the costal margin, between which the infuscation is much darker. A circular clear spot on the anterior side of fourth vein, between the cross veins, with a smaller, dark spot in the general infuscation above it, just below the third vein. Obliquely below the tip of the second vein the dark bar splits into five rays, which run to the tips of the third, fourth and fifth veins and between the two latter, two others, equidistantly, to hind margin in second posterior cell. Upper outer corner of discal cell infuscated, an abbreviated ray running from the tip of the anterior cross-vein nearly across the cell. Costa yellow except through the dark areas, with which it is concolorous. Sixth vein stopping short well before margin. Halteres yellow.

Long 4 mm.

Described from a unique male in fair condition, taken at Banhar, North Bihar on 13th March 1921. (*H. A. Inglis*). Type in my own collection.

The much greater amount of infuscation between the tip of the auxiliary and the anterior cross veins, and the upward directed apical ray to tip of the third vein, amply distinguish this species from its two Indian congeners which have the frontal bristles arranged 1 : 3.

DIOPSIDÆ.

TELEOPSIS BIPUNCTIPENNIS, sp. nov. (Plate XIII, fig. 1.)

♂♀. *Head*: width across tips of eye stalks 2½ times that of thorax in male, twice that of thorax in female. Frons black, ocelli golden, on a somewhat elevated triangle. A subtriangular reddish spot below and exterior to ocellar triangle, eye stalks and occiput reddish, a triangular black area based on eyes extends along eye stalks above until it fuses with the black vertical area, which extends backwards, broadly, to neck, which is reddish. Frons with short black hairs and a long bristle above at inner corner of eye, and divided from face by a black ridge, more distinct in male. Face reddish, with pale silvery pubescence and hairs. Epistome distinct, mouth parts hidden, except yellowish labellæ, which are strongly ridged. Antennæ reddish, second joint with apical margin dark with short black bristles, outer margin of third below the black, bare, arista with pale yellowish pubescence.

Thorax: shining black, with sparse long soft erect hairs. Humeri and pleuræ with pale pubescence. A notopleural bristle, no longer than the dorsal hairs, and a long, strong, supra-alar. Metapleural spine short. Scutellum concolorous, with short black hairs and an apical pair of long, brownish-black spines, each of which bears at its tip a long black bristle, twice as long as the spine itself.

Abdomen: black, shining, the terminal segments in both sexes down-curved and somewhat swollen. Lateral margin with a fringe of short, soft, black hairs. Male genitalia concealed, in female a pair of small yellow lamellæ visible. The membrane between the segments, when exposed as by the down-curving of the apical ones, pale brownish.

Legs: coxæ yellow, fore pair with shining white pubescence on basal half exteriorly. Fore femora reddish-yellow, incrassate, with a row of short black teeth and some longer hairs below, darkened apically, with shimmering white pubescence sparsely distributed over posterior side and concentrated in a patch at inner edge of apical infuscation on anterior side. The pubescence only visible when viewed with tip of femora towards observer. Posterior femora yellow, with apical third black. Fore tibiæ black except for the extreme base, yellow. Mid tibiæ basally yellowish, darkening to dark brown on apical two-thirds, hind tibiæ with basal half yellowish, darkening to dark brown on apical half. Tarsi yellowish, except fore metatarsi, which are brown exteriorly, the inner sides thickly furnished with bright golden pile.

Wings: extending beyond the tip of abdomen, infuscated, with sub-apical clear patches in sub-marginal and second posterior cells, the latter immediately

beyond the posterior cross-vein. The infuscation fades to almost clear in the costal and axillary cells. Halteres yellow.

Long: 5 to 6·5 mm. the female distinctly the larger.

Described from five males and seven females, all in good condition, and all taken at one sweep of the net on leaf of a plant growing in the water at edge of the Suduganga river, on 10th August 1919. Most of the insects were on the underside of the leaf, which was not more than six inches above the water.

Type, allo-type, and ten co-types in my own collection.

MUSCIDÆ.

Idiella euidielloides, sp. nov.

♂♀. *Head*: frontalia black in male, very dark brownish in female. Parafrontalia greyish silvery, with a black spot around the base of each frontal. Male frontalia at narrowest about as wide as first antennal joint, female one-fifth of head. Face and epistome shining, very dark brown. Antennæ black, third joint grey-dusted. Arista black with base yellowish. Rays long. Occiput black, genæ yellow with long soft concolorous hairs, at base of each of which there is a small black dot. Proboscis and palpi black.

Thorax: ground colour of dorsum dark metallic green, with grey pollen, closely covered with black dots, from each of which arises short hair. Viewed from in front there are black median and dorso-central stripes, not at all distinct. Scutellum concolorous with mesonotum, the apical margin shimmering silvery. Pleura whitish yellow, with long soft hairs of same colour, arising from small black dots. Chætotaxy: 4 prescutellars—a humeral—2 notopleural—antreior supra-alar 1—posterior 1-3—(the latter on postalar callus)—2 mesopleural, pteropleural weak—sternopleural 0-1, strong. Scutellars 6.

Abdomen: male dorsum shining dark brown, lateral margins of first, second and third at base yellowish brown, of remainder of third and fourth, including tip of the latter, dark metallic green. Female dorsum with all first and basal half of second segment pale brownish yellow, apical half of second third and fourth dark brown, lateral margins and tip of fourth broadly shining, dark green.

Legs: femora black with dark green metallic reflections, tibiæ yellow, apically darkened to a varying extent, sometimes over all the apical two-thirds, first joint of fore, first two joints of posterior tarsi whitish yellow, remainder black.

Wings: costa infuscated in front of second vein, the band extending, subapically, outwards and downwards to bend of fourth vein, fading away

below, the apex, below tip of fourth vein and exterior to it, clear. Squamæ white, margin of lower somewhat darkened. Halteres orange yellow.

Long 5·5 mm.

Described from a pair (type and allo- type), in good condition, taken on a flower shrub, Shillong, 13th October 1920, by the Imperial Entomologist and a female, in indifferent condition, on a hedge in the native village, Shillong, on 12th October 1920. All in my own collection.

This species has the small facies of a *Euidiella*, and is very like *quadrinotata* Bigot superficially.

EUIDIELLA DISCOLOR, Fab. var. NIGRIPES. (nov. var.)

♂. *Head*: black, parafacialia with some shimmering silver grey spots: lunule and sides of face except for median triangular patches brownish. Genæ yellow with long yellow hairs. Antennæ, proboscis and palpi blackish, third joint of the former grey-dusted. Arista basally yellow, remainder black, rays few and short.

Thorax: dark green with some greyish pollen and very numerous black spots each bearing a hair, scutellum concolorous, its apical margin narrowly whitish shimmering. Pleura yellow, with long concolorous hairs. Chætotaxy humeral 1: presutural 2: supra-alar 2-3: prescutellar 2: notopleural 2: mesopleural in a fan: sternopleural 1-1: usual hypopleural fan. Scutellars 6.

Abdomen: extreme base black. First three segments dorsally yellow, their hind margins black banded, with a median black stripe greatly broadened on the third. Fourth segment silvery yellow-grey, black spotted, hind margin black. A faint median dark stripe.

Legs: fore coxæ dark grey, superficially appearing black: posterior pairs obscurely brownish. All femora black, fore tibiæ black, posterior pairs dull brown. Fore metatarsus and first three joints of posterior tarsi yellowish, remainder black.

Wings: clear, absolutely without trace of infuscation at tip of second vein. Squamæ and halteres pale yellowish.

Long 7 mm.

Described from a unique male in good condition, taken at Emelina Estate, Maskeliya, Ceylon, between 25th and 29th December 1919. In my own collection.

In a long series of *E. discolor* from various localities in Ceylon and North Bihar, I find the yellow fore coxæ and base of hind femora constant, whether belonging to true *discolor* or form *muscina*, Rondani. Normal specimens occurred in company with this specimen, which, further, is distinctly larger than any such seen by me. I give it, until more material comes to hand, varietal rank only.

EUIDIELLA NILA, sp. nov.

♂. *Head*: black, parafacialia with some greyish shimmering spots. Antennæ and proboscis black, third joint of former grey-dusted. Palpi dark brownish. Genæ and a narrow postocular margin whitish grey, the former with long concolorous hairs.

Thorax: very dark blue, with a little whitish pollen and numerous black spots, each bearing a short hair. A median and dorso-central black stripes, indistinct. Scutellum concolorous with mesonotum, with apical margin shimmering silvery. Pleura obscurely blackish with greenish brassy reflections, hairs sparse though long, black, whitish above base of fore coxæ and on sternopleuron. Chætotaxy: humeral 1: presutural 1: supra-alar 2-3: prescutellars 4: notopleural 2: a mesopleural fan: sterno-pleural 1-1: a hypopleural fan. Scutellars 6.

Abdomen: dully shining greenish blue, with grey pollen, the first segment dark, blackish. Second and third broadly black banded on fore and hind margins, and with a median black stripe. Fourth segment similar, but basal band, except laterally, and median stripe narrow.

Legs: fore coxæ black, grey-dusted, posterior pairs yellowish brown. All femora, fore tibiæ and tarsi black, posterior tibiæ and tarsi dark brownish.

Wings: clear, very slightly smoky, but not definitely infuscated except around the humeral cross-vein. Squamæ smoky brown, halteres orange yellow.

Long 6·5 mm.

Described from two males in good condition, taken at flowers, Coonoor, on 25th September 1920

Type and co-type in my own collection.

METALLEA FLAVIBASIS, sp. nov.

♀. *Head*: frontalia brown above, shading to orange at lunule, containing an elongate triangle of shimmering pale golden pollen, the base of which contains the ocelli, its apex reaching half way down frons. Parafrontalia of a similar shimmering pale golden pollen. Frontal width one-quarter of head, slightly but distinctly more narrowed at vertex than in *notata*. Face yellow with a little grey pollen in sub-antennal depression. Parafacialia continuous and concolorous with parafrontalia. Genæ similar, with white hairs. Epistome shining pale yellow, palpi concolorous, with brown tips, proboscis black. Antennæ orange, third joint white-dusted, arista black with orange base, naked. (Under a high power microscopically pubescent). Occiput black on upper, yellow on lower half. A yellow triangle, its base upmost, from vertex to neck. Upper posterior eye, margins narrowly grey.

Thorax: dorsum metallic green, so thickly dusted with yellow pollen as to hide the ground colour entirely unless rubbed, the whole appearing dull olive instead of the bright green of *notata*, with black spots at the bases of the bristles. Scutellum concolorous, pleuræ also, but when rubbed the ground colour appears blackish.

Abdomen: first segment pale yellow, sometimes second and third also, or these two segments reddish brown, their hind margins always narrowly pale yellowish banded. Second segment sometimes with subapical transverse brown flecks towards the sides, third segment with subapical black band sometimes obscure, sometimes clear cut and more greyish, fourth and side margins of second and third grey with black spots from which arise bristles. A median black stripe throughout, sometimes absent on first segment, sometimes broadened T-shape sub-apically (in which case the hind margin is narrowly yellow banded as the next two always are), this stripe interrupted where it crosses the apical yellow bands. Venter yellow, with lateral grey spots, small on second and large on third segment. Fourth all grey.

Legs: coxæ dark grey pollinose, femora yellow, their apical halves blackened to a varying width, the extreme tips yellow: tibiæ yellow, the tips more or less darkened: metatarsi yellow, remainder blackened.

Wings clear, squamæ white, halteres pale yellow.

Long 5–6·5 mm.

Described from twenty-four females all in good condition, taken at Suduganga, Matale, Ceylon in January, March, June, August and October of various years, one at fresh cut earth, remainder on windows. Type and cotypes in my own collection.

Amply distinguished from *notata* (v. d. W.) by the yellow bases of the femora and the entire absence of shining green on the abdomen.

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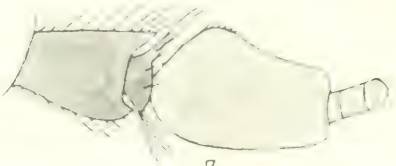

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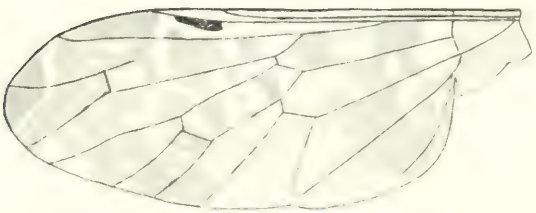

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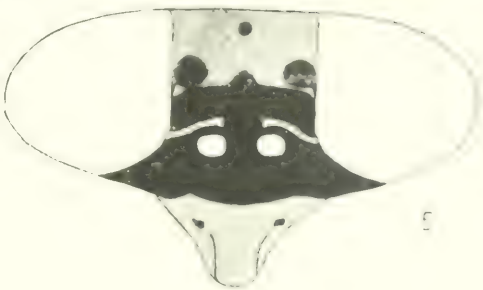

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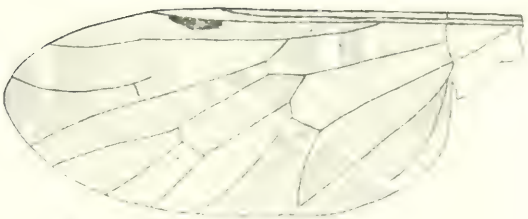

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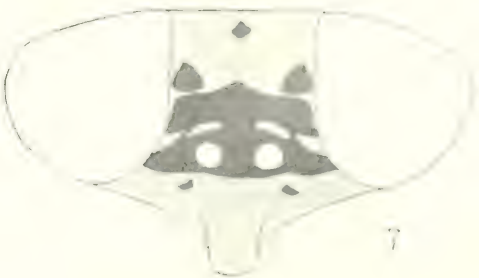

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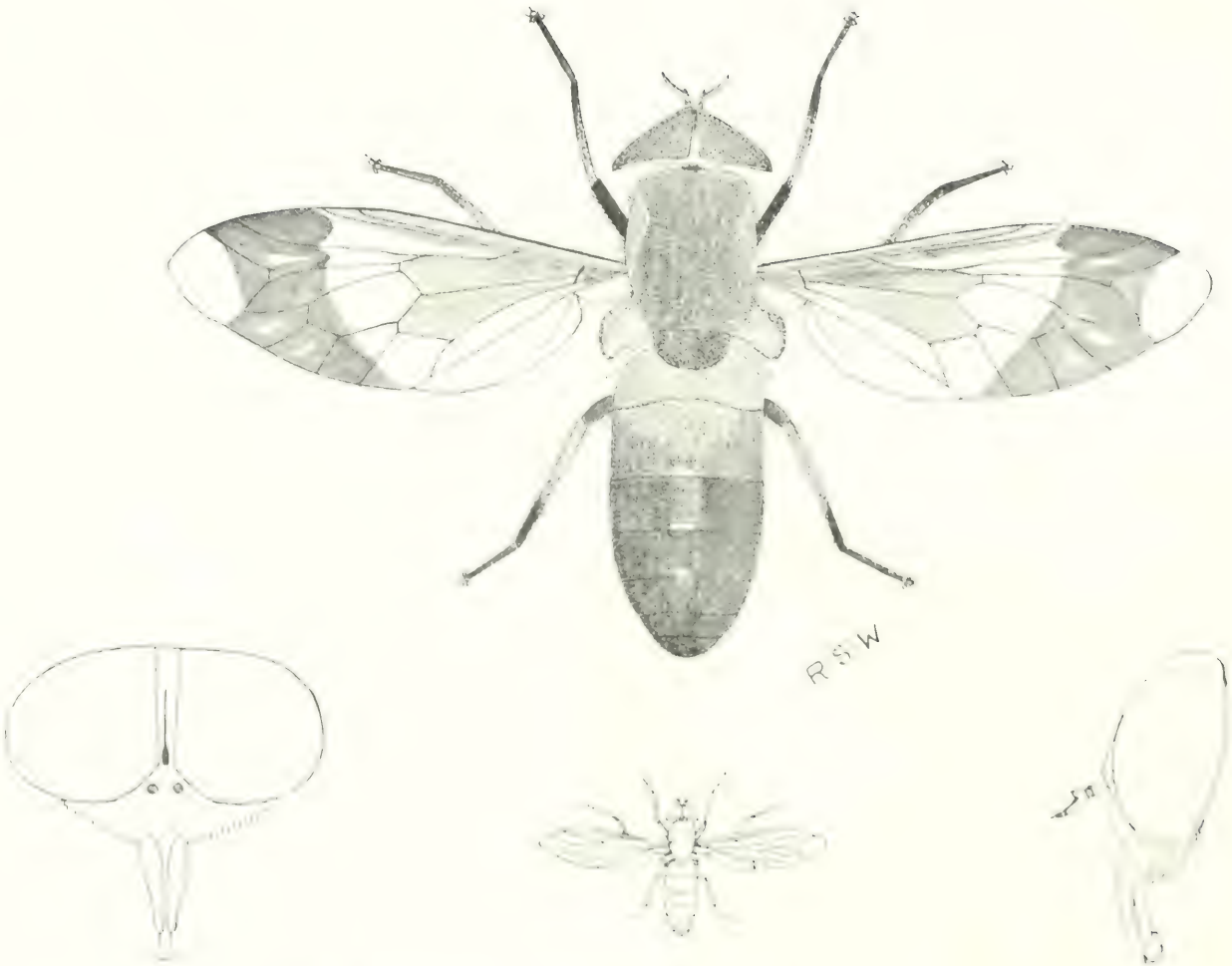
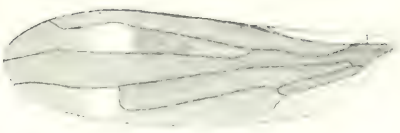


Tabanus kakhyenensis. Senior-White.

PLATE XII.



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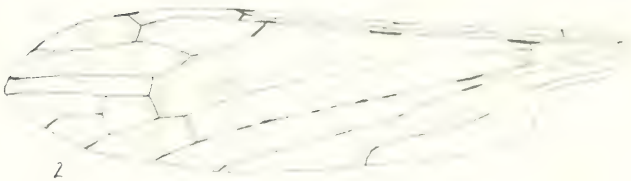

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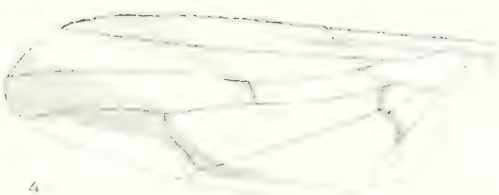

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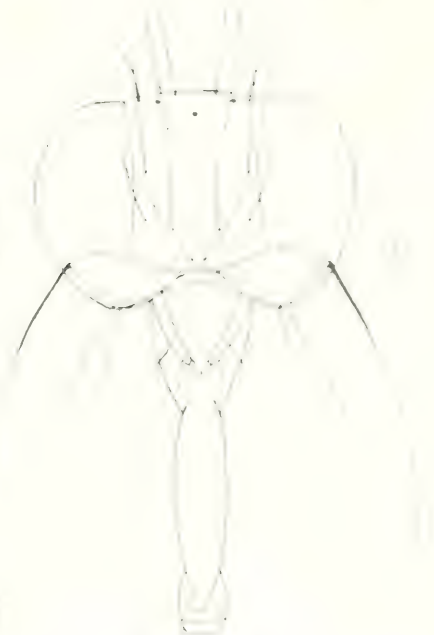

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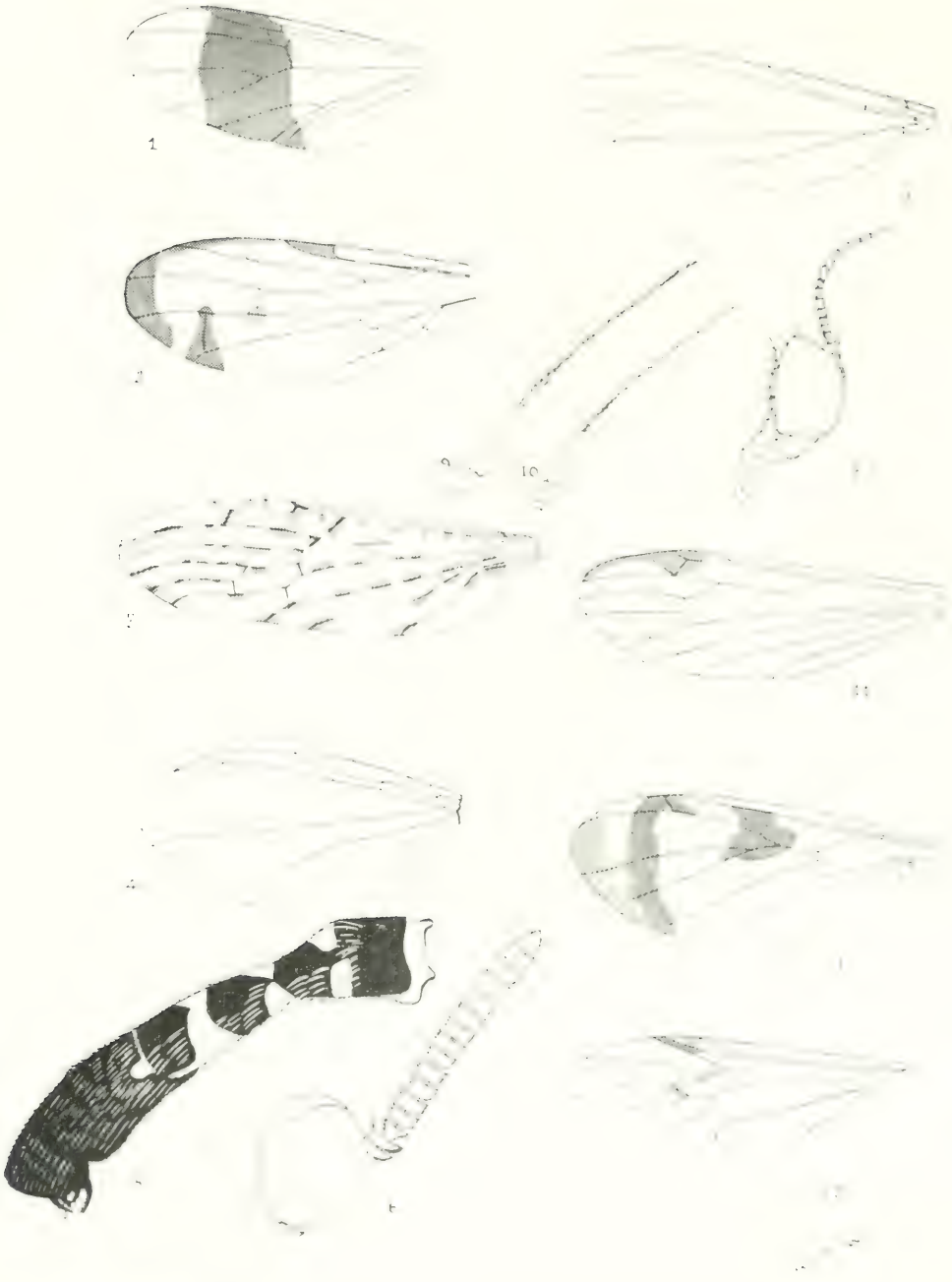
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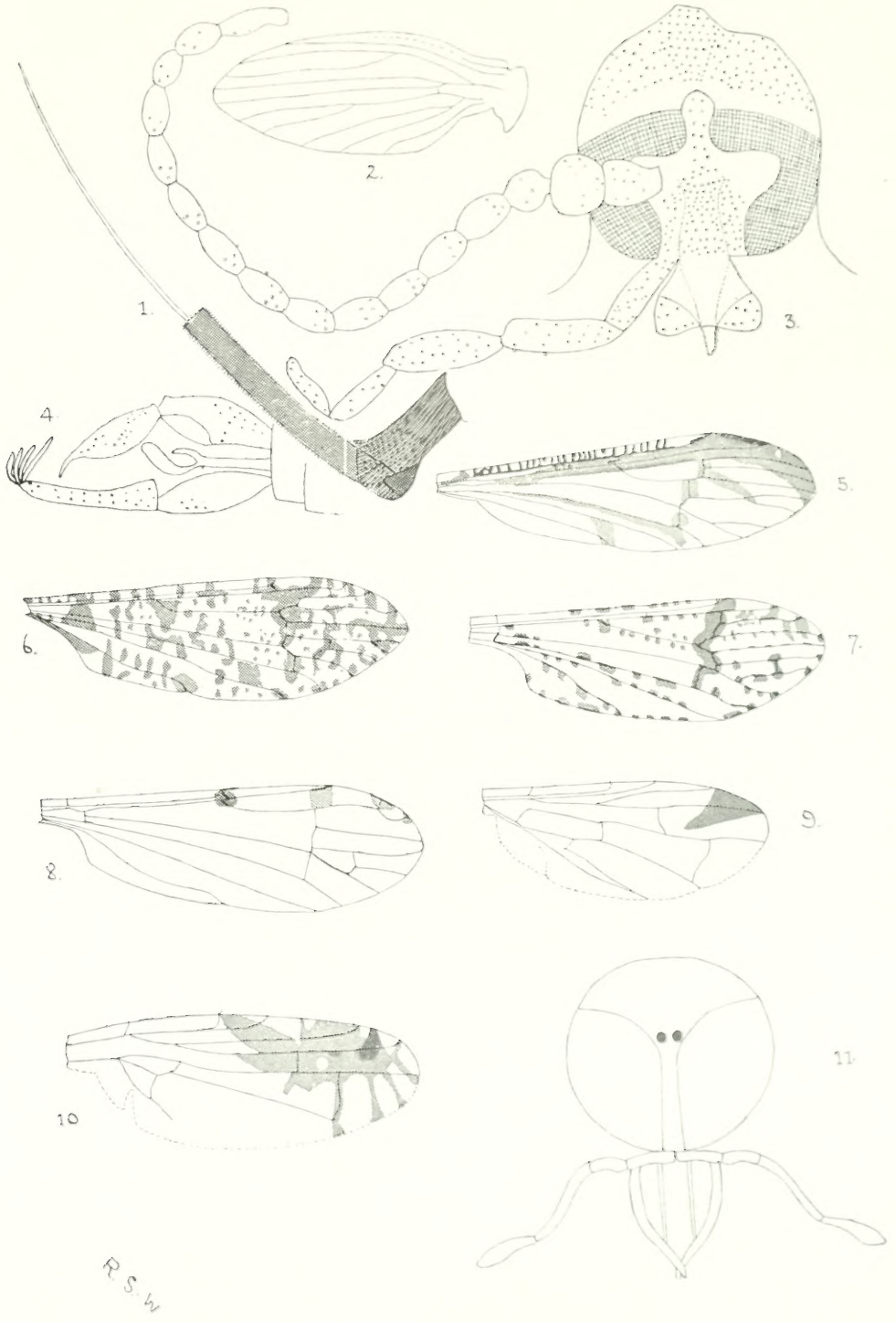

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